ELECTRICAL TIMES

THURSDAY
1 JUNE
1950
SIXPENCE

B.I. Callender's

Mass Impregnated Non-Draining CABLES for INDUSTRY

. . . are described in this new Publication No. 280V. Everyone concerned with industrial cable installations should have this leaflet. Write to-day for a copy.

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

The New
B.N.E.
model
C. 49
The cooker that has EVERYTHING.

★ IT WILL TAKE A LOT OF RATIONS TO FILL *THIS* OVEN

And even when real joints can again be enjoyed, there will be no complaints on the score of size. Although conforming to B.S.1195 dimensions, the capacity of the oven is really big—over 2,400 cubic ins. Thermostatic control is standard and both side and bottom heating elements are fitted, the bottom element being in an enclosed compartment in the floor of the oven, giving more even heat spread, and easier cleaning facilities. Cleaning the C.49 oven is really simple—lift off the side screens, pull out the side elements and an empty oven free of crevices and corners is left.

The C.49 has many more attractive features and the delivery position is good. Can we send you further details?

BRITISH NATIONAL ELECTRICS LTD.

The Domestic Appliances Section of JOHNSON & PHILLIPS LTD.

NEWARTHILL · MOTHERWELL · SCOTLAND.

A BNE Product
OF JOHNSON & PHILLIPS LTD

For *Silent* faultless action choose *MUTAC*

FOR USE ON A.C. ONLY

Careful and extensive research into microgap switching for alternating current — extreme mechanical and electrical efficiency — silence in operation — precision manufacture coupled with exhaustive routine tests in all stages of production — *THESE* are the reasons why the "*MUTAC*" switch is now universally accepted as the greatest advance in switch design of recent years.

"*MUTAC*" (*Regd. Trade Mark*)

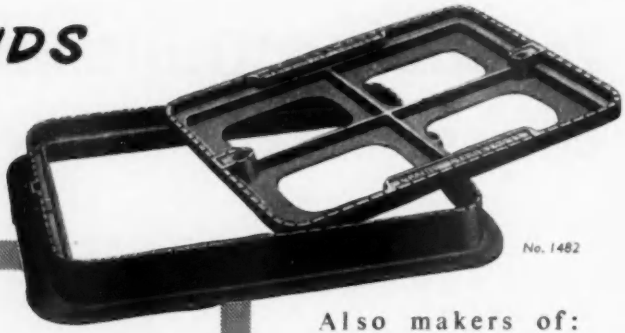
SURFACE AND FLUSH MOUNTING

Silent A.C. SWITCHES *by* G.E.C.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

A

THOUSANDS have been SOLD...



No. 1482

ROUND CORNERED PAVEMENT COVERS AND FRAMES

16 Standard Sizes

Also makers of: Roadway Covers and Frames · Lamp Pillars and Brackets · Kiosks and Pillar Casings

ESTABLISHED 1814

HARDY & PADMORE LTD., WORCESTER. Tel: WORCESTER 3215

M-W.101

ADHESIC AIR FILTERS

The multiple unit construction of the PREMIER ADHESIC AIR FILTER allows it to be built to any shape to fit an existing space, without loss of efficiency. Further, it eliminates the need for structural alteration or special foundation—Cleaning may be carried out without putting the filter out of action.

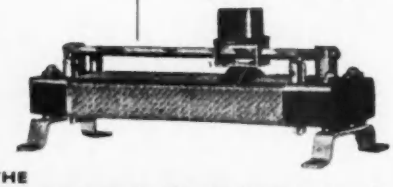
We shall be pleased to send you our brochure on receipt of your address.

THE PREMIER COOLER & ENGINEERING CO., LTD.
Shalford Nr. Guildford Surrey.

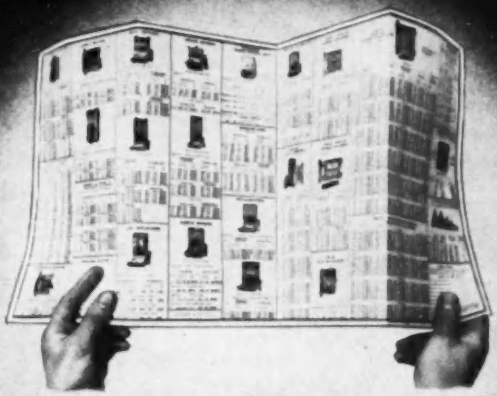
SEND YOUR RESISTANCE PROBLEMS TO US

List No. 80 containing data and prices of our standard sliding Resistances is both useful and interesting. May we send you a copy?

● We shall be glad to co-operate in their solution and to suggest suitable Apparatus. CRESSALL Resistances incorporate the soundest electrical and mechanical principles in design—yet prices are competitive.



THE CRESSALL MANUFACTURING COMPANY, LTD.
TOWER STREET, BIRMINGHAM, 19
Phone, Aston Cross 2666 (3 lines). Grams "Ohmic" B'ham



PUBLICATION Nº 450GL GIVES
CONSOLIDATED REDUCED PRICES OF
BILL SWITCH AND DISTRIBUTION GEAR

A COPY WILL BE SENT ON REQUEST

SCOTLAND & N. IRELAND.
J. D. HARRIS,
47, NETHERBURN AVENUE,
NETHERLEE,
GLASGOW. S.4.

BILL SWITCHGEAR LTD
ASTON LANE. PERRY BARR
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INDIA & PAKISTAN
J. A. B. JACOBSEN,
22-24 RITHEROON ROAD,
LONDON S.W.17.

PHONE: BIRCHFIELDS 5011. GRAMS. "BILSWITCH" BHAM.

More than 100,000 housewives use this

Baby Belling

in their homes every day

Immediate despatch

Since the original Baby Belling was produced by us 25 years ago more than half a million have been sold all over the world, and it is still the most popular cooker in its class.

Our national advertising will bring you orders. Have you a Baby Belling on Show?

N.B.—The grill boiler conforms to E.D.A. Interchangeability Specification

BELLING & COMPANY LIMITED, BRIDGE WORKS, ENFIELD, MIDDLESEX

CRC 351

CABLES FOR HOUSEWIRING?

WE HAVE THESE

- **V.I.R. Taped, Braided and Compounded.**
- **V.I.R. Lead Sheathed.**
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- **FLEXIBLES.**

Comprehensive stocks of General Cables, including the above, are held at Leatherhead, Birmingham, Manchester and Glasgow.

Deliveries can be made at short notice through your usual wholesaler. In case of difficulty write to Leatherhead.

GOOD CABLES TODAY PREVENT TROUBLE TOMORROW

GENERAL CABLES

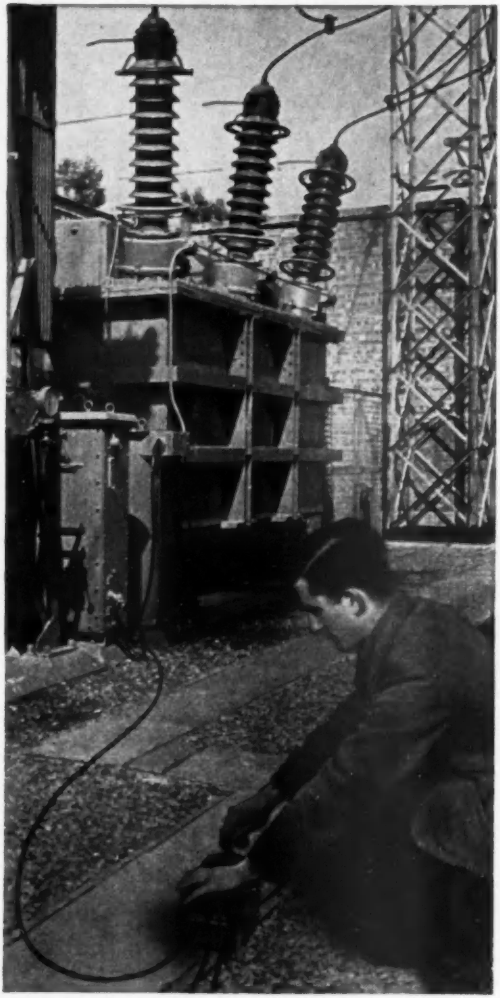
THE GENERAL CABLE
MANUFACTURING CO. LTD.
LEATHERHEAD. SURREY.

TELEPHONE: Leatherhead 3021 (4 Lines) TELEGRAMS: Isolde, Leatherhead

The New Series 4 'MEGGER' EARTH & EARTHOMETER TESTERS

A smaller and cheaper series of Megger Earth Testers and Earthometer Testers, the Series 4, embraces features well-known in the company's larger instruments for determining the resistance to earth of earth electrodes, thus ascertaining if their resistance is sufficiently low to ensure correct operation of protective gear and to minimise lightning dangers. The Earthometer Tester will, in addition, measure the impedance of complete earthing circuits including electrode resistances at both sub-station and consumer's premises. **Write for Leaflet J051/25.**

There are also Series 4 Megger Insulation Testers. They are described in ***Leaflet J051/5 available on demand.***



- **TWIN SCALES** (0–40 and 0–200 ohms, or 0–100 and 0–500 ohms, as specified).
- **RANGE SELECTOR SWITCH**
- **FOUR TERMINAL INSTRUMENT** with special switches linking together pairs of terminals.
- **LIVE LINE DETECTOR** to protect Earthometer Tester.
- **SPRING TYPE TERMINALS**
- **SMALL HANDY PLASTIC CASE** (Weight 6 lbs.)

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5/145

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It's a *clear* aid to quicker selling—Clarifoil with its transparency, versatility, and toughness! Whatever your product, whatever it's size or shape, Clarifoil will sell it on sight! It can be used as a complete wrapping, as an overwrap or as a window box. Flexible, waterproof, greaseproof, Clarifoil is printable in multi-colours and can be laminated to metal foils, to paper and paperboard. See your goods sell through Clarifoil!

Technical information and impartial advice will be given and, where possible, practical demonstrations. Enquiries to:

BRITISH CELANESE LIMITED

Plastics Division: **Celanese House, Hanover Square, London W.1**

STORAGE MADE SIMPLE

"SECO" STEEL STORAGE EQUIPMENT FOR FACTORIES & STORES

We specialise in the production of steel storage bins, racks and extendable storage systems to suit all requirements. Seco Steel Equipment can easily be assembled by unskilled labour on site.

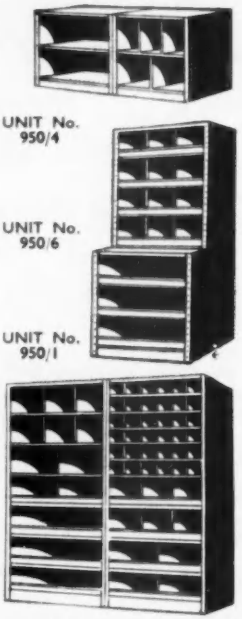
We also manufacture specialist installations to customers' own specifications. Seco equipment gives maximum storage capacity to minimum space available. The illustrations show typical examples of the Seco Standard Units now available.

Write for List, E.T.

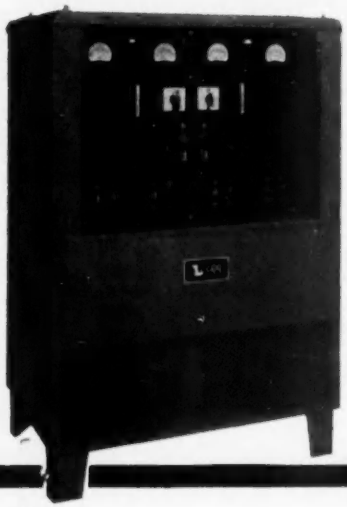
The STEEL EQUIPMENT Co. Ltd.

GREETS GREEN, W. BROMWICH, STAFFS., ENGLAND

Tel. TIPTON 1137-8-9 Grams. EQUIPIT W. BROM.



L.G.B.



LEGG TWO-RATE RECTIFYING EQUIPMENT

FOR USE WITH SWITCH TRIPPING BATTERIES

Illustrated here is the Legg Two-Rate Rectifying Equipment for use with 115 lead acid cells capacity 150 ampere-hours and having the following outputs—
Quick charge plus floating load 10/11.5 amps adjustable between 230/316 volts.
Trickle charge plus floating load 100 m.a./1.5 amps adjustable between 247/276 volts.
Legg Industries design and manufacture rectifying equipment for all purposes where metal rectification can be used.

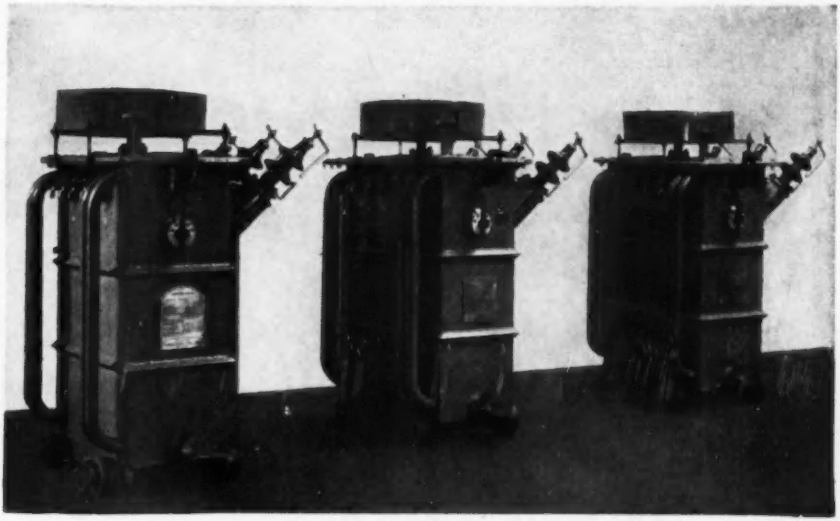
Legg (INDUSTRIES) LIMITED

WILLIAMSON STREET · WOLVERHAMPTON

4043B

HERMETICALLY SEALED!

Thompson Relief Chamber (Patented)



Part of a Contract for 72-100 KVA Transformers for Southern Rhodesia.

Designed to give

trouble-free service under damp and humid conditions, this type of unit is operating perfectly in India, East and West Africa, Malaya, Ceylon, etc.

NO MOISTURE or ACIDITY of OIL
NO SLUDGING of OIL
NO SERVICE COSTS

STANDARD TRANSFORMERS UP TO 2,000 KVA ALSO SUPPLIED

Apply for Brochure to—

THE LINDLEY THOMPSON TRANSFORMER & SERVICE CO. LTD
ST. MARY'S ROAD, SLOUGH, BUCKS.
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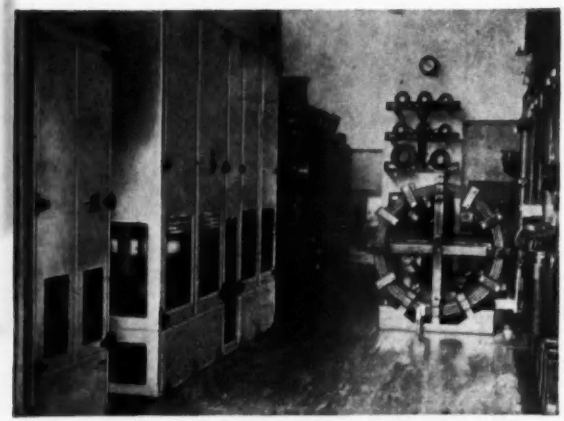
Hewittic Rectifiers

—the first trolleybus system to be supplied with D.C. entirely from

FULLY AUTOMATIC (unattended) SUBSTATIONS



A Hewittic rectifier substation supplying the Hobart trolleybus system.

THE inherent characteristics of the Hewittic rectifier—its low no-load losses and its absolute reliability under the severe conditions of traction service—have made the unattended substation an economic proposition.

London Transport Executive, for instance, operates many of its 80 *Hewittic rectifier substations, unattended, on a* 24*-hour basis.*

Hobart claims the distinction of having the first trolleybus system supplied entirely from fully automatic (unattended) rectifier substations—**and the whole of the converting plant comprises HEWITTIC RECTIFIERS.**

Over a Million kW. in World-wide Service

HACKBRIDGE AND HEWITTIC ELECTRIC CO. LTD., WALTON-ON-THAMES, SURREY

Telephone: Walton-on-Thames 760 (8 lines) Telegrams: "Electric," Walton-on-Thames

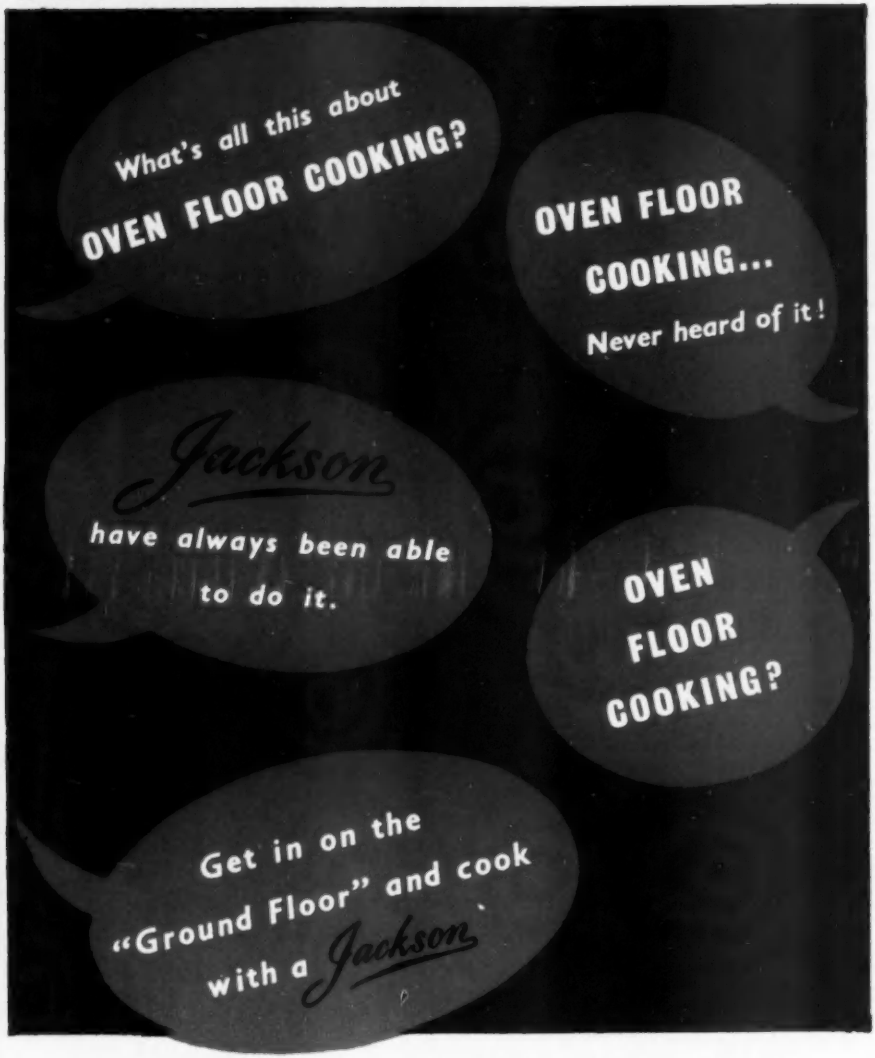
Easy to get up country

When cables have to be transported to remote situations, the 20% to 70% saving in weight is an even greater factor in favour of **J. & P. SEAMLESS ALUMINIUM SHEATHED CABLES**—a factor greatly appreciated by overseas users.

British Patent Nos. 627815, 627793.

JOHNSON & PHILLIPS LTD.
CHARLTON LONDON S.E.7
The mark that means that "little more" in quality

TALKING OF OVEN FLOOR COOKING . . .


What's all this about
OVEN FLOOR COOKING?
OVEN FLOOR COOKING...
Never heard of it!
Jackson
have always been able to do it.
OVEN FLOOR COOKING?
Get in on the "Ground Floor" and cook with a Jackson

It is surprising that so many people fail to realise what OVEN FLOOR COOKING really means. Think what it will mean to the housewife—15% more cooking space. This is possible, with a Jackson Cooker—with what other cooker can you pack your oven from the very floor to the top and achieve perfect cooking results so cheaply—so cleanly—and without constant attention? That is why Jackson GUARANTEE their enormous food capacities. Offer your customers these exclusive features by recommending Jackson.

THE JACKSON ELECTRIC STOVE CO. LTD., 143 Sloane St., London, S.W.1. *Phone:* SLOane 6248

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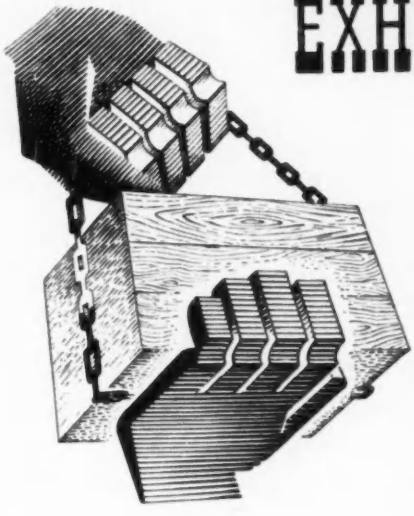
ELECTRIC EQUIPMENT

AT THE

MECHANICAL HANDLING EXHIBITION

1950



OLYMPIA
LONDON
JUNE 6-17

Our Stand — No. A. 29 b. Grand Hall.

THE
BRITISH THOMSON-HOUSTON
COMPANY LIMITED RUGBY ENGLAND

A 4145

Courtesy of the Borough of Harrogate (Electricity Dept).

SOLID SETTING FILLING & INSULATING COMPOUNDS . . .

"KINGSNORTH" Compound No. 235. For use where a fairly wide range of temperatures is to be met, e.g. for above-ground cable joint boxes, and is also specially suitable for bus-bar chambers of heavy duty switchgear. Complies with British Standard Specification 803 (Type 2) and 688 (Class III).

★ *Write for new publication showing full range of . . .*

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Electrical Filling & Sealing

compounds

BERRY WIGGINS & CO. LTD., Field House, Breams Building, Fetter Lane, London, E.C.4. HOL. 0941

★ *SPECIAL OFFER of OVER 200 MILES OF*

PAPER INSULATED · LEAD COVERED AND ARMOURED

POWER CABLES

B.S.S. 480/1942

All sizes available including the following

187 drums	4 core	·10 sq. in.	P.I.L.C.&S.	660 volts	
1 drum	4 ,,	·15 ,,	P.I.L.C.&S.	660 ,,	
1 ,,	4 ,,	·10 ,,	P.I.L.C.S.W.A.&S.	660 ,,	
50 drums	4 ,,	·04 ,,	P.I.L.C.S.W.A.&S.	660 ,,	
25 ,,	4 ,,	·04 ,,	P.I.L.C.&S.	660 ,,	
20 ,,	4 ,,	·0225 ,,	P.I.L.C.S.W.A.&S.	660 ,,	

All by well-known makers

ALL AT

33%

BELOW MAKERS' PRICES

Guaranteed Unused and on Original Drums of 500 yd. lengths

★ *IMMEDIATE DELIVERY FROM*

LIPTON PRODUCTS LIMITED

Phœnix Works, Lamprell St., London, E.3 Telephone: ADVance 3345-2442 Grams & Cables: Lipasbest, London

THE WORLD'S LARGEST CABLE STOCKISTS

Meticulous Metering

by the METROVICK TYPE NF Watt-hour Meter

I — SOME NOTABLE FEATURES

- Straight-line accuracy over a wide range of load.
- Complete temperature compensation.
- High accuracy over wide range of voltage.
- Damping system giving complete stability.
- Simple and accessible adjustments for calibration.
- Resilient lower (jewel) bearing.
- One terminal block for all capacities.

Other advertisements in this series will deal separately with the features.

METROPOLITAN-VICKERS ELECTRICAL CO. LTD.

TRAFFORD PARK, MANCHESTER 17

G/A 905

Wise Man!
● Easily installed.
● Quiet in operation.
● Consumption only 25 watts.
● Air displacement 14,000 cu. ft. per hour.
This Window Fan carries a National Physical Laboratory Certificate confirming its performance.
XPELAIR
WINDOW FAN

A G.E.C. PRODUCT

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

THEY COME TO STAY

Durawires
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Duracables

(P.V.C. Insulated)
are Non-Ageing

Sole Manufacturers:

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FELTHAM Telephone: Feltham 3453-6 MIDDLESEX

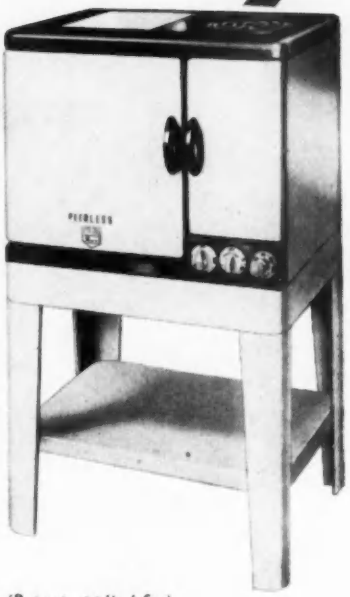
For use on a TABLE or with a SPECIAL STAND

Revo

Here is the

'PEERLESS'

ELECTRIC COOKER



'BIG COOKER' capacity — 'SMALL COOKER' consumption

A table cooker of unique qualities, providing the facilities of a full-sized model, but so designed to allow for connection to the electric supply by means of a standard 13 or 15 amp. plug.

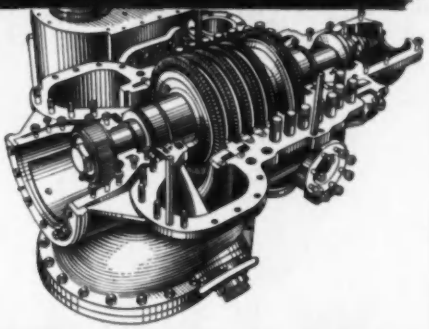
Equipment comprises a grillboiler with 3-heat switch and a boiling plate with "Simmerstat" control, while the oven is thermostatically controlled by a "Revostat." The cooker is finished in black and cream enamel and may be supplied with or without stand.

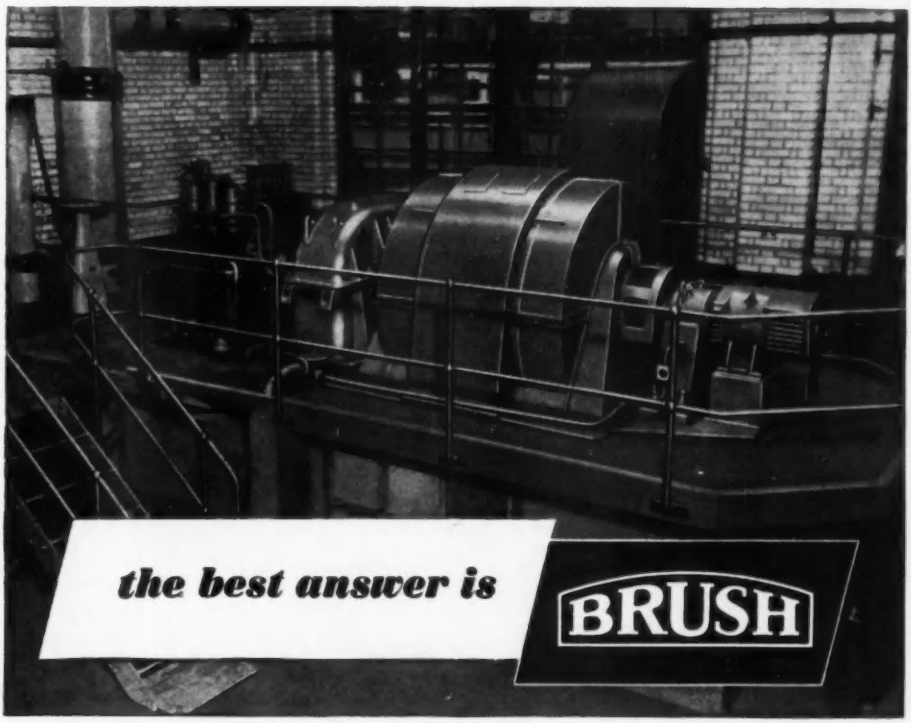
(Patent applied for)

REVO ELECTRIC CO. LTD., TIPTON, STAFFS

POWER from PROCESS STEAM

The recurrent headaches of present fuel costs can often be relieved, if not actually cured, by giving process steam the extra task of providing electric power. Brush axial-flow turbines exist in a range which meet—fully and economically—the various steam conditions of differing industries. If you use process steam and also need electricity, why not a consultation with our engineers.





The Brush Electrical Engineering Co. Ltd., Loughborough, England.
London, Birmingham, Cardiff, Manchester, Leeds, Newcastle, Glasgow.

15.35

A dual connection, allowing you to plug in 2-amp or 5-amp fuse plug while 15-amp plug is in use.

More than this—

If 15-amp plug is NOT in use, you can insert 2-amp or 5-amp fuse plug direct in Socket. I.e., one 15-amp Socket gives 5 different connections:—

Also available for WYLEX Ring Main

WYLEX

DUAL PLUG SYSTEM

"Must be Good"

Descriptive Leaflets from :—

GEORGE H. SCHOLES & Co. LTD.

WYLEX WORKS, WYTHENSHAWE, MANCHESTER

QUICK DELIVERIES!

Cost A LITTLE MORE *Last* A LOT LONGER

It is true that PYRAMID cost a little more than ordinary aluminium utensils, but then, there never was anything quite the equal of PYRAMID aluminium ware for hotplate cooking. PYRAMID utensils are specially manufactured with quarter inch thick bottoms; they are solid drawn in steel dies, and their thickness and quality cannot vary. They are scientifically ground by a special process to give a dead flat surface and are so constructed that distortion is avoided. Consequently, PYRAMID utensils continue to give "all over" contact with the hotplate, and so save electricity, for years after their cost has been forgotten.

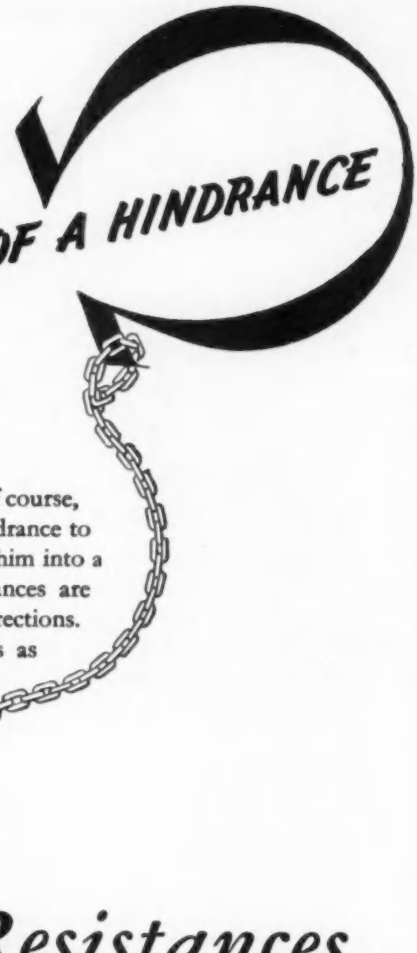
PYRAMID

ALUMINIUM WARE

HAGUE & McKENZIE LTD., PYRAMID WORKS, BIRMINGHAM 1

4038B

MAKING A HELP OF A HINDRANCE



Are you making the best use of the Ohm?

Speaking quite personally, the Ohm is, of course, an essential part of our business. A hindrance to the flow of current, we have converted him into a useful servant and today Birch Resistances are playing their part in a hundred different directions. We manufacture various standard types as outlined below, but you will find them all alike in their reliability and in giving long and faithful service.

Birch

Registered Trade Mark

Resistances

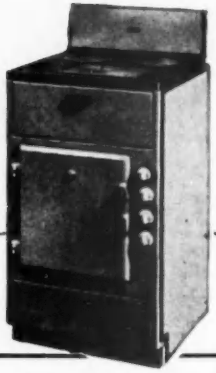
Make a note of them, there may be some that you are needing now. We shall be glad to quote you.

DIMMERS—REGULATORS, (Field, Shunt, Voltage)
RESISTANCES (Arc Lamp, Charging, Regulating, Sliding)
RHEOSTATS—ELEMENTS and SPIRALS
ASBESTOS WOVEN Resistance Nets and Grids.

All Resistance problems come within our scope. Please call on us to help you solve any problems which may arise.

H. A. BIRCH & CO. LTD. Wilohm Works, Wood Street, WILLENHALL, STAFFS.
Telegrams : "WILOHM" Willenhall. Telephone : Willenhall 494-495
London Office : 33, Sudbury Court Road, Harrow. Tel. : ARNold 2694

B.R.4



CARRON 'H.3' ELECTRIC COOKER

Hob structures to E.D.A. Specification • Extra large oven, thermostatically controlled • Self-indicating reciprocating switches • Easy access to fuses • Modern clean design • Strongly constructed of cast iron and sheet steel, finished in vitreous enamel. Write for full technical details and prices.

This is a Carron product made by modern Carron processes embodying the Carron tradition for fine workmanship begun in 1759.

CARRON

CARRON COMPANY, CARRON, FALKIRK, SCOTLAND

Showrooms & Offices: 15 *Upper Thames Street, London, E.C.4.* 22-26 *Redcross Street, Liverpool, 1.* 125 *Buchanan Street, Glasgow, C.1. Office :* 14 *Ridgefield, Manchester 2.*

B2

BECAUSE of Civic pride, as well as because of the growing appreciation of the fact that public lighting must be planned to suit conditions, more and more Public Lighting Authorities are specifying and installing...

ELECO EQUIPMENT

Manufactured in the light of over 50 years' specialised knowledge

EASTERN AVENUE, WOODFOOD: Lancaster fittings, 400 watt horizontal Mercury lamps — demonstrating planned controlled cut-off lighting, even distribution, good definition of objects and kerb.

ENGINEERING & LIGHTING EQUIPMENT CO. LTD.

SPHERE WORKS, ST. ALBANS, HERTS.

Telegrams: VOLTARCON, ST. ALBANS *Telephone:* ST. ALBANS 2258/2259

ELECO

HIGH VELOCITY BLOWING

"In Kenya, Sir. During the hot weather of '29. Hardly more than a breath of wind and the temperature at 200° centigrade. Phew, hot!—I'll say it was."

"This one, yes. Timor Sea in '31. Don't know how we got the brute home, by Gad! Came on to blow a full gale. 290 miles per hour. Wonder where the Hell all the wind comes from."

Quite true, that remark of old Colonel Blowhard.

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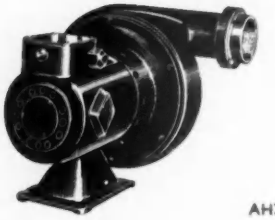

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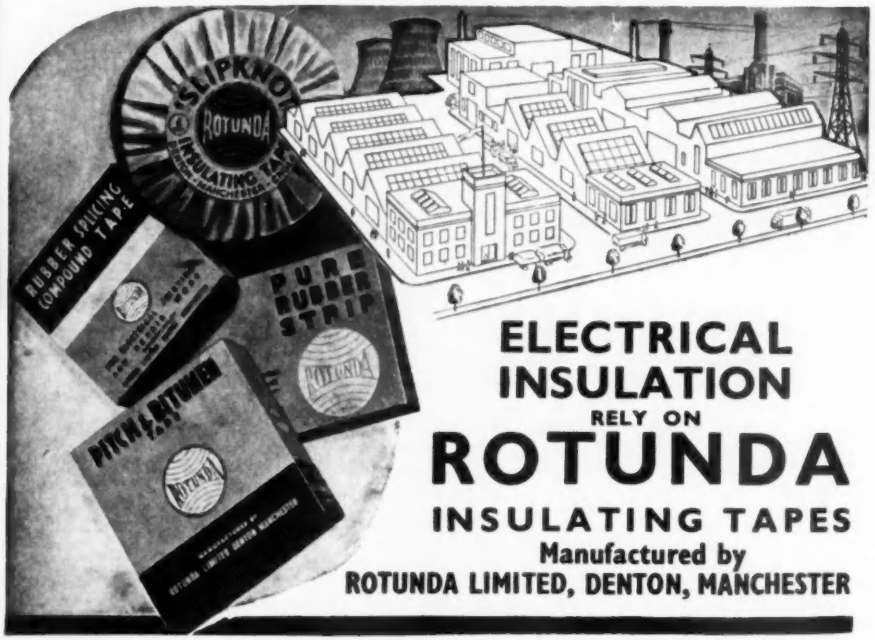

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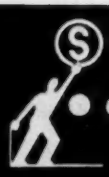

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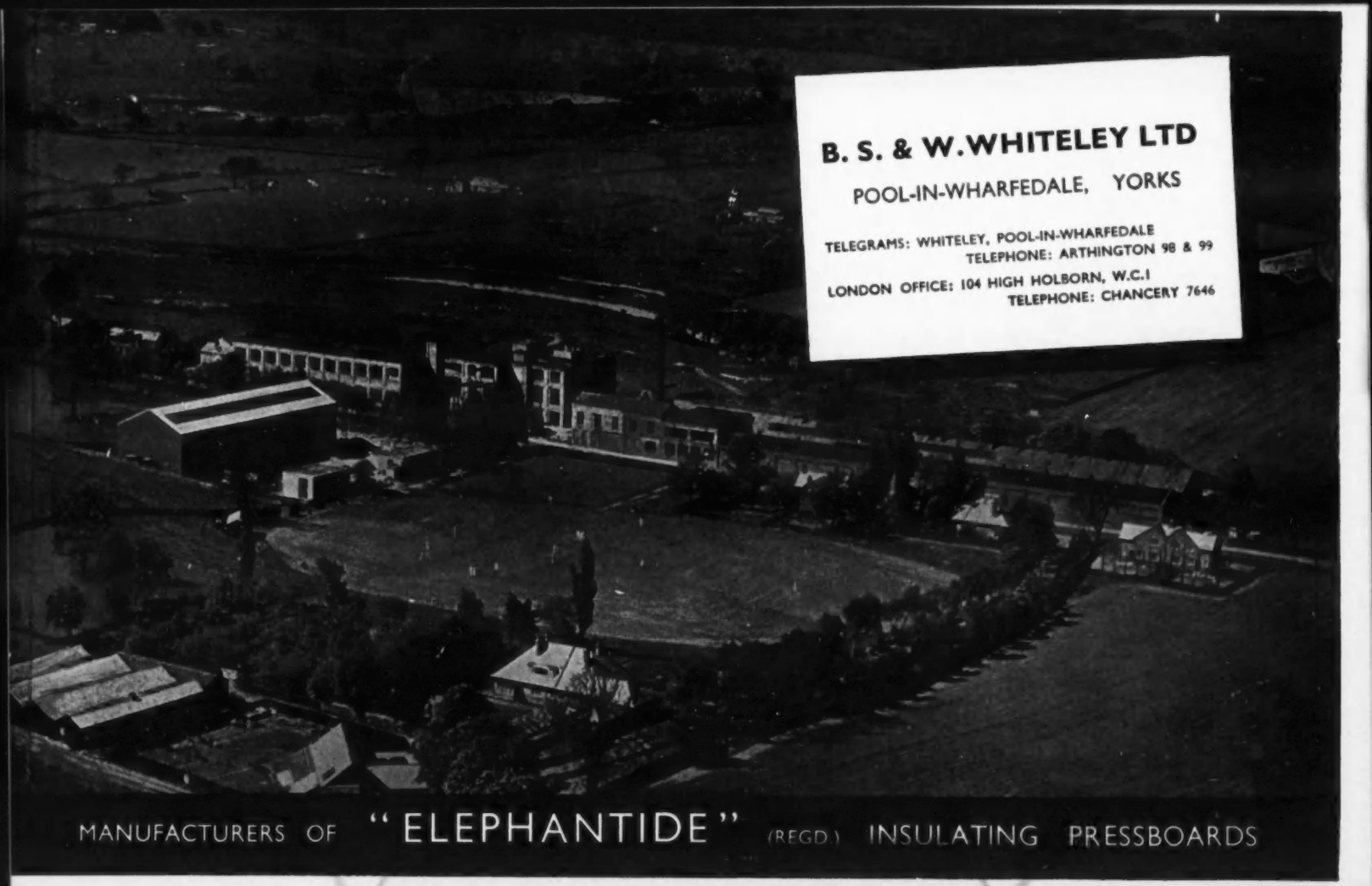
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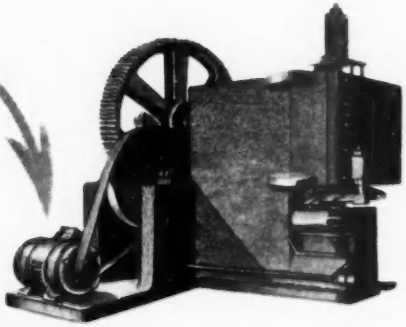

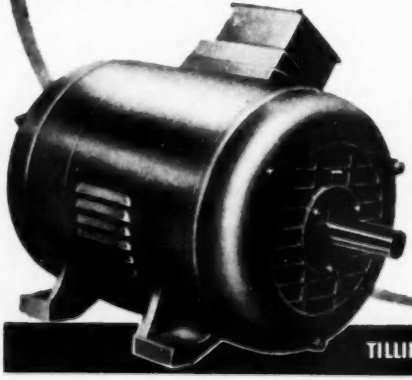

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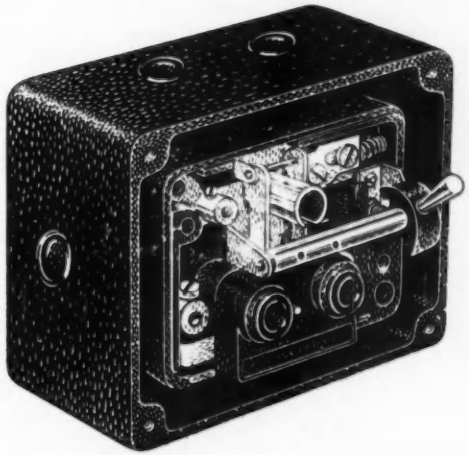

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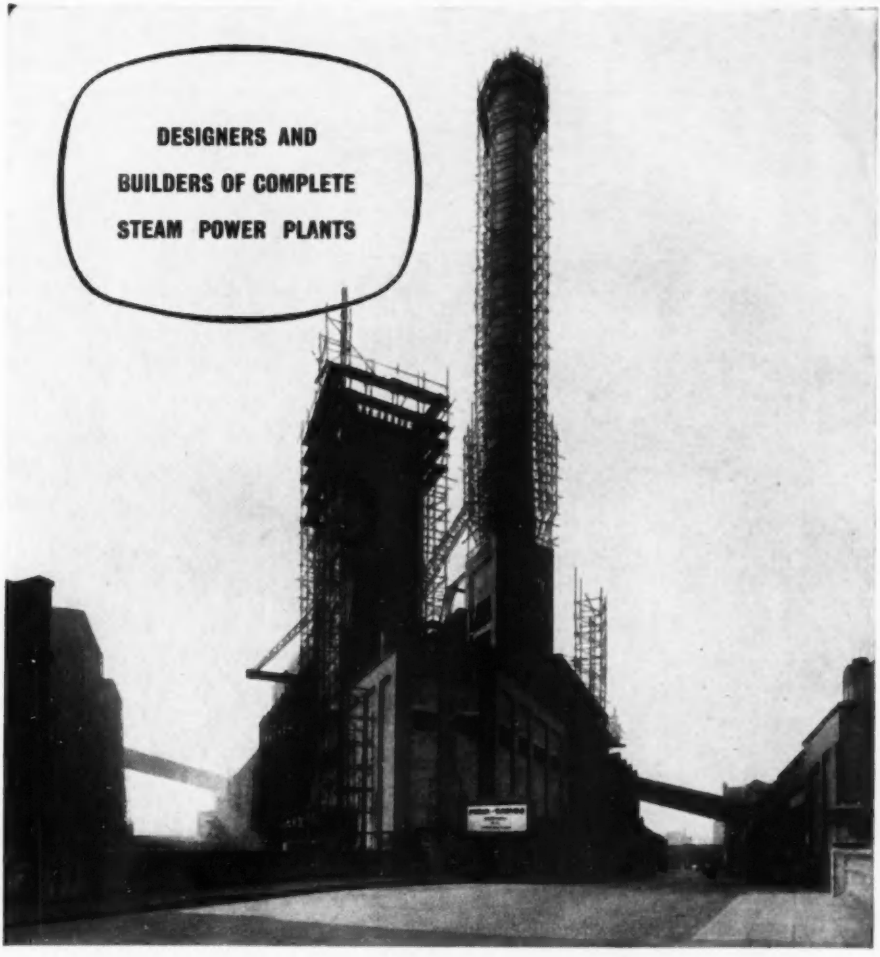

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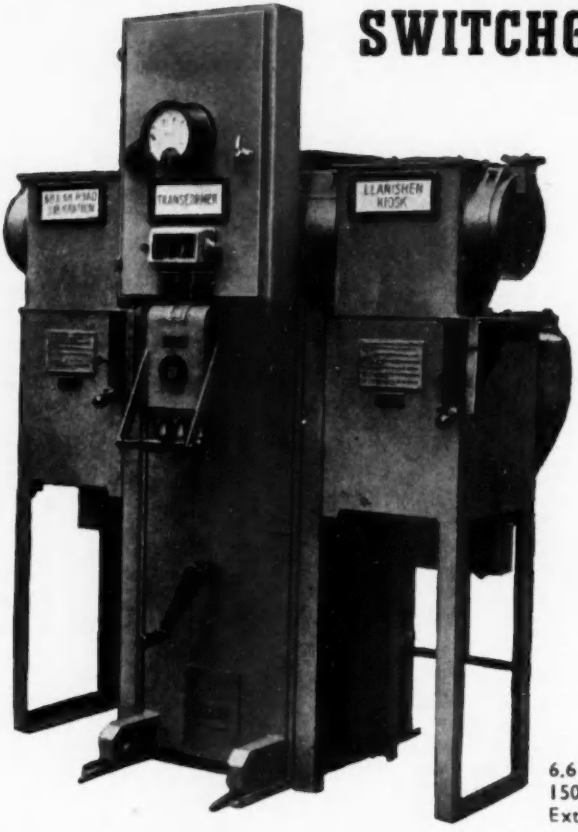

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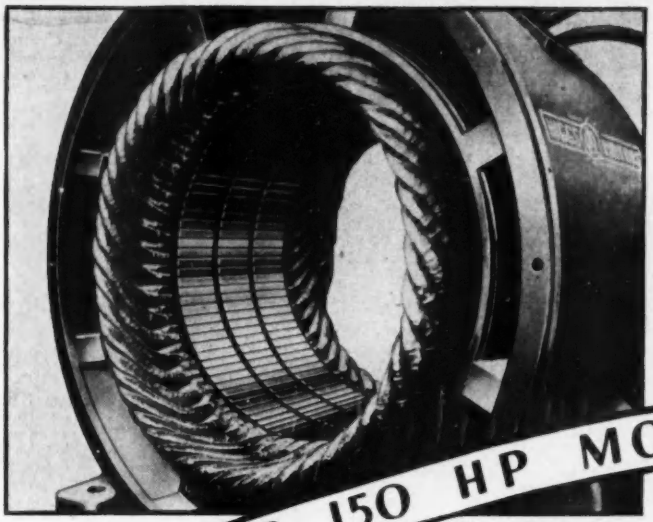

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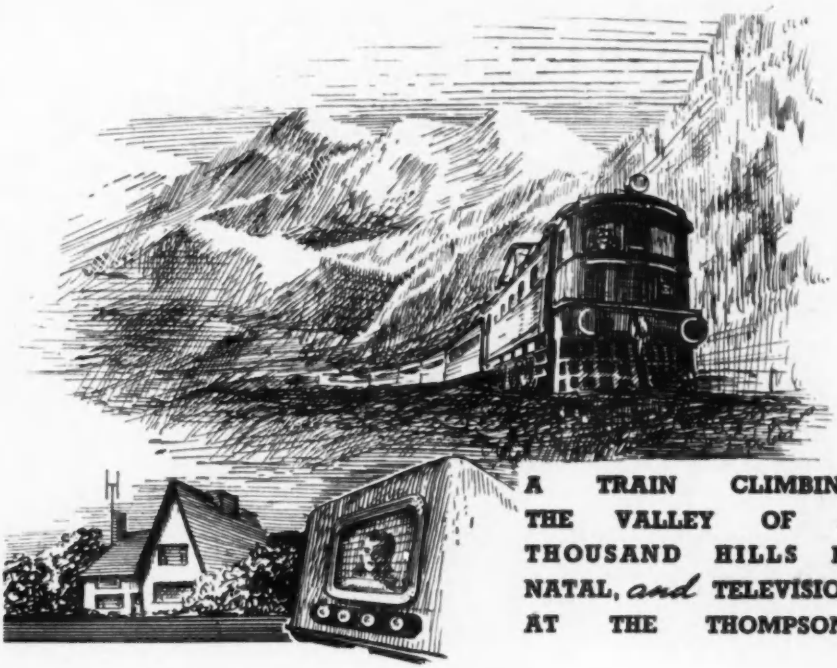

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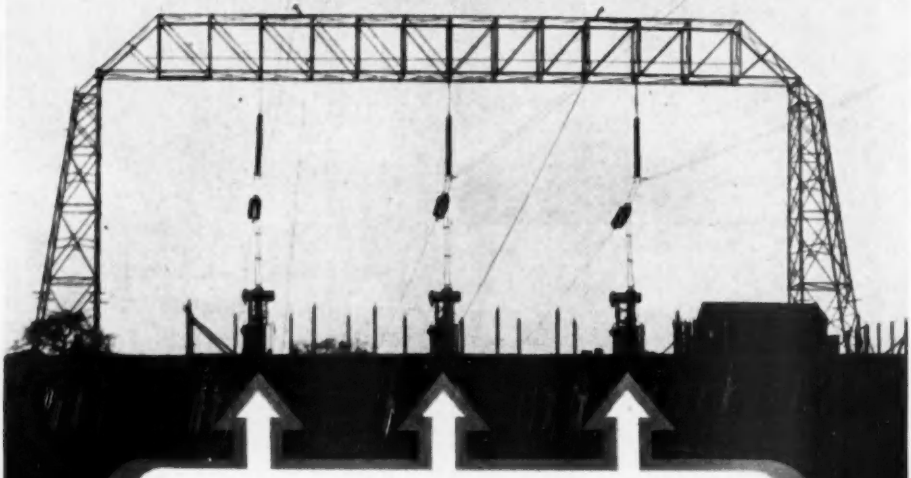

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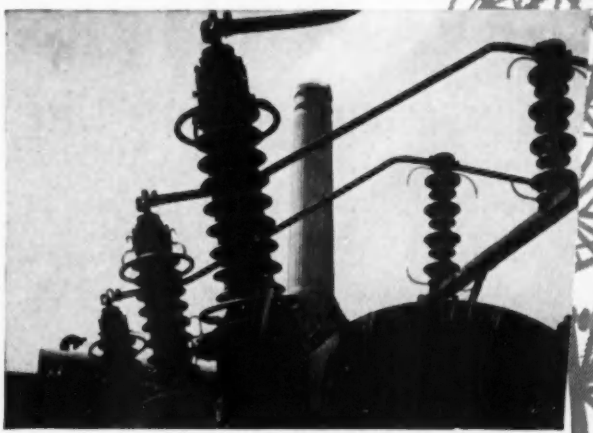

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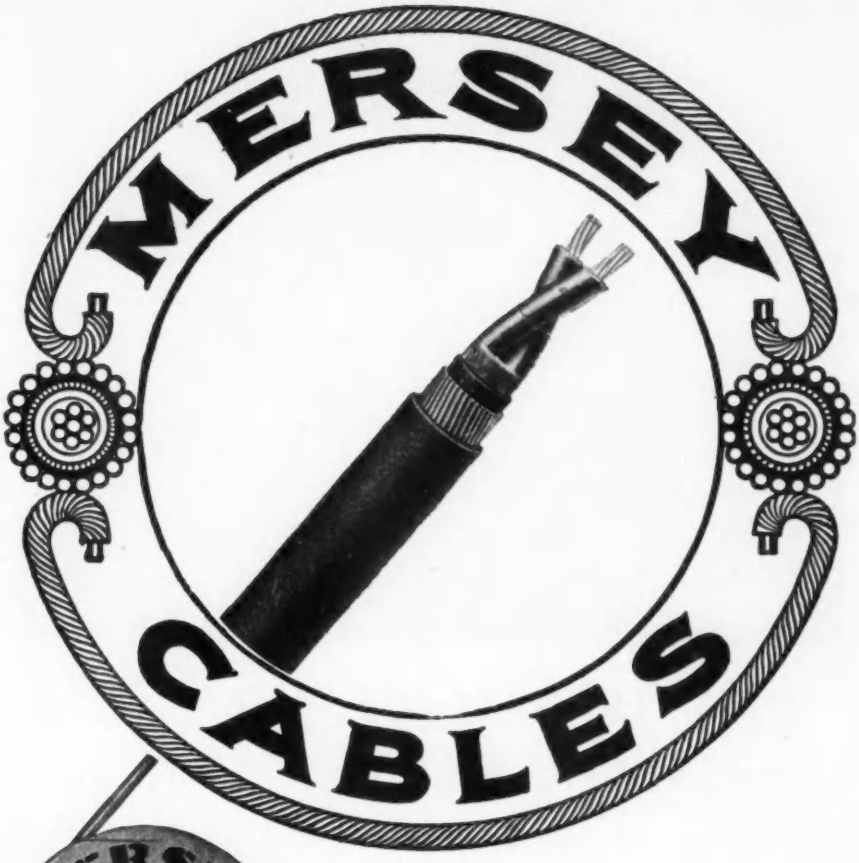

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ELECTRICAL TIMES

Vol. 117 No. 3056 THURSDAY, 1 JUNE, 1950

PUBLISHED EVERY THURSDAY

FIFTY-NINTH YEAR OF PUBLICATION

Squirrel-Cage or Slipring Motors? *by G. M. Kett*	899
Our Readers' Views	906
Problems and Practice in Engineering	907
Contractors at Hastings	909
New Literature	914
Supply Section Conversazione	914
House of Commons Lighting	915
Notes on Wiring *by "Megohm"*	916
Lighting fit for an "Empress"	917
Overseas News	918
Personalities in the Industry	920
The I.E.E. Annual Report	923
"Working Wonders" at Aberdeen	924
The Buyer's Column	925
Ring Main Wiring	926
The Week in News	927
Electric Supply News	932
Company Activities	933
Commercial Information	934
Classified Advertisements	*49*
Index to Advertisers	*56*

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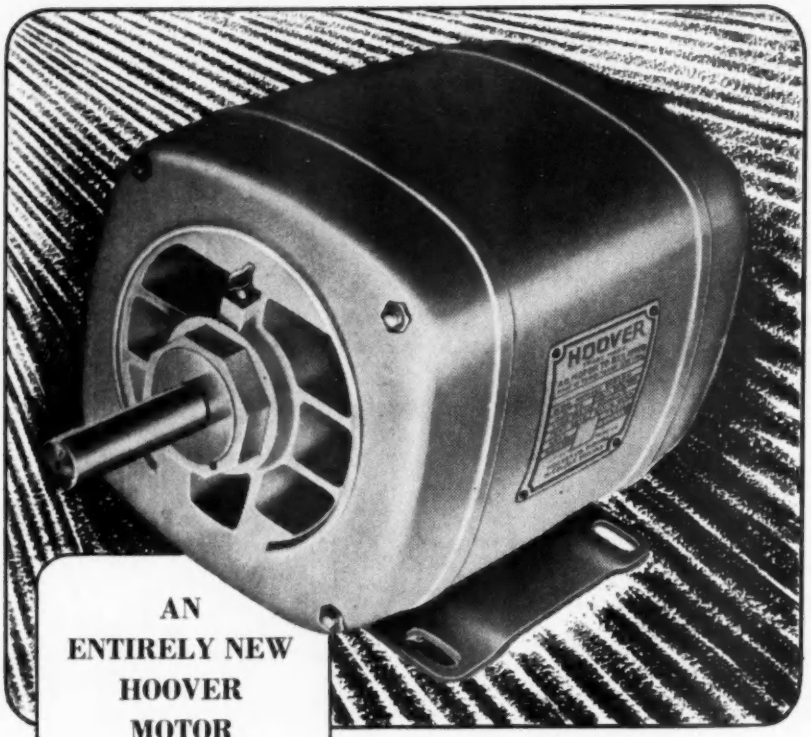

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Editorial

BONE OF CONTENTION

A POINT that was continually arising at the E.C.A. Conference (reported elsewhere) was the anomaly existing between private contractors and the Area Boards regarding conditions and, more particularly, rates of pay. Without going too deeply into the pros and cons of the matter, it does seem more than a little peculiar, particularly in these days when the passionate desire for grading and standardisation is so evident in all fields of endeavour, that two men, both members of the same trade union, both doing the same sort of job, may come under the schedules of different N.J.I.C.s, and so be paid at different rates. Admittedly the Area Boards might find some difficulty in segregating their staff terms and conditions for their contracting departments, but the matter is one which merits the most serious consideration. Bluntly, the contractors who are losing trained men to the lure of higher pay feel that the Area Boards are reaping where others have sown. This feeling must be scotched at once, if there is to be real goodwill within the industry.

LABOUR IS CAPITAL

TO SAY that good wiremen are hard to come by is more than an understatement. There is, today, a distressing tendency to refer vaguely to "manpower" or "labour" as though it were something which could be bought in bulk, like electricity or pig-iron. Electricians, unlike poets, are made and not born, and the best of them are made the hard way. Skilled men, trained and knowledgeable, who know their employer's methods and can be trusted to do a good job without constant supervision, are an employer's capital, and are more important than cash, plant, or even goodwill. Finance can be arranged, plant can be purchased, but it is as difficult to replace tried and trusted operatives as it is to replace an oak tree by planting acorns. Small wonder then, that private contractors in some areas view with concern the prospect of even a small-scale migration—for who can blame the men themselves taking advantage of the prospect of higher wages? Like all right-thinking men, we earnestly desire to see the electrical industry peaceful and prosperous. But we do not want to see a fictitious "departmental" prosperity, wherein one section of the industry profits at the expense of another. Area Boards will have to make a very good case for the retention of the N.J.I.C. anomaly.

PUT AND TAKE

IT is fortunate that we no longer have to face such difficult trading conditions as those of a few years ago, which compelled British machine tool manufacturers to go to Italy to buy British motors to fit to their machines for export. Nevertheless, the conflicting requirements of Europe today, with the urgent need for more capital equipment and the necessity for more dollars, can lead to anomalies no less great. It has recently been disclosed that one million dollars worth of electrical equipment is to be supplied to Italy by the Westinghouse Company under an E.C.A. programme. Within a few days, we learnt by airmail from Manila that an Italian firm has been awarded the whole contract for the Mindanao hydro-electric station in the Philippines, which is well within the close trading orbit of the U.S. It is such news as this that gives a measure of the broadmindedness which the world expects from American business men.

THE TASK OF EXPORTS

THIS order is also a reminder that trading conditions of the future may go beyond the bounds of ordinary commerce under

this world famine of dollars. Already the Australian and New Zealand markets are being attacked by German manufacturers, despite the most difficult trading conditions. Japan, too, is commencing to make inroads into India and Pakistan electrical trade, with goods reported to be less than one-half British prices. Cut-price competition is always the most difficult to meet and if it is answered by technical superiority then that superiority must be paramount. It is not enough to make the best goods, their quality must be sufficiently high above that of competitors to justify purchase on a commercial basis. For this, the country looks to the electrical industry, not only for its high tradition of technical achievement but because in a few years time it may well prove to be our major exporting industry.

THE PHOTO-TRANSISTOR

LATEST product of the Bell Telephone Laboratories, according to the current issue of *Electrical Engineering*, is a new photo-electric cell which was developed during work on the Transistor. Unlike the Transistor, it has only one contact point, pressed against a small dimple ground in a germanium disc. At the bottom of the dimple, the germanium is only about 3 mils thick, and light focused on the other side produces a photo-electric effect. It is claimed that, in spite of its extremely small dimensions (the entire unit is contained in a tiny cylinder about the size of a 0·22 miniature rifle cartridge case), its output is high, being in certain cases enough to operate a switch (*sic*) without intermediate amplification. As the device is still in the experimental stage, and no performance figures are yet published, it is not possible to forecast its practical applications. The rectifier or barrier-layer photocell of which this is a new variation, has, of course, been in use for some years, and in the photo-electric exposure meter, we have a familiar example of the operation of an instrument without amplification. If, however, germanium applied as a photocell represents an advance as outstanding as it did when applied as a crystal rectifier, its simplicity, robustness and small size may have far-reaching effects on the technique of industrial electronics.

AFTER THE STORM

THE TORNADO in the Bedfordshire-Buckingham district, to which brief reference was made in last week's issue, emphasised—by default—the value of short-wave radio for jobs of this nature. Smart as was the work put in by the Chilterns Sub-Area staff, it would seem that they were seriously hampered by lack of communication facilities. Since telephone lines are usually the first to break under storm conditions, it follows that one loses one's vital links at the very moment when they are most needed. While weather conditions of this severity might not occur again for a decade or more, it is a mistake to imagine that radio is only of value under emergency conditions when all other methods have failed, because it is much more than this. It is a valuable working tool for ordinary daily routine operation, particularly in rural areas where staffs are spread thinly and communications are, at best, a one-way business.

POSITIVELY NO DECEPTION!

ONE OF these days, no doubt, to boast that every repair van has two-way radio, and every linesman a walkie-talkie, will be like preening oneself on having water laid on to the house—it will be to confess oneself out of date. Up-to-date Area Boards will use radar, and really know where everything and everybody is. During the war, there were embarrassing moments for some of the smaller naval craft when confronted with a radar plot showing unauthorised departures from course for the purpose of buying fish from a trawler, and it does not require much imagination to see that in this peacetime application the filling-in of work sheets and patrol reports would leave little scope for the imagination. Prohibited areas such as "Joe's Caff" and the car park at the "Linesman's Rest" would, of course, be marked on the P.P.I. and bells would ring if a service van approached within a hundred yards. Science, as usual, would have a lot to answer for.

Meteor

Squirrel-Cage or Slipring Motors?

Improvements in Squirrel-cage Machines widen their sphere of application

By G. M. KETT*

DEVELOPMENTS, within recent years, of squirrel-cage "current displacement" type rotors have reduced to a considerable extent the number of applications for which slipring motors provide any appreciable advantage in practical service.

To provide a true basis for comparison, the starting characteristics for typical slipring motors will be described, followed by an explanation of the limitations of single cage type motors and how these can be overcome by the use of rotors of the "current displacement" type.

Slipring Starting Characteristics

It is frequently considered that slipring motors necessarily have low values of starting current, and figures of 100% full load torque with 125% full load line current are often stated. It is true that any slipring motor is capable of this starting performance and with certain types of starters will provide such characteristics, but reference to the permissible limits for starting currents stated in B.S.S. 587 (rheostat starters) will show that, in the majority of cases, starting and accelerating peak currents are in practice considerably higher than the usually assumed figures. Relevant extracts from B.S.S. 587 are given in Table 1.

Table 1.

	Peak Current as % of Full Load	
	Initial	Between steps
Faceplate Starters		
up to 10 h.p.	150	150
" " 15 h.p.	125	150
over 15 h.p.	100	150
Drum Starters		
up to 25 h.p.	200	300
" " 100 h.p.	150	250
over 100 h.p.	$100 + \frac{5{,}000}{\text{b.h.p.}}$	$200 + \frac{5{,}000}{\text{b.h.p.}}$
Contactor Starters		
up to 25 h.p.	250	350
" " 100 h.p.	225	300
over 100 h.p.	$125 + \frac{10{,}000}{\text{b.h.p.}}$	$200 + \frac{10{,}000}{\text{b.h.p.}}$

It will, no doubt, be appreciated that the permissible peak currents dictate a minimum number of steps for each type of starter, the choice of the values of permitted currents obviously being a compromise between the actual value of current required to obtain the necessary starting torque, and economical considerations with regard to the number of steps. This particularly applies to contactor starters as extra steps involve additional contactors, hence the relatively high current peaks permitted for starters of this type.

Two observations regarding this table are necessary before the practical effect of these regulations can be shown.

1. The peak currents are applicable only to starting torques not exceeding full load torque. Permissible peak currents for torques exceeding full load values are not stated in B.S.S. 587, but it is obvious and implied that higher current values are unavoidable and permitted for higher values of starting torque. When it is desired (and if it is possible) to limit the starting current to the tabulated figures, more expensive starters with additional steps are necessary.
2. The current peaks on the second and subsequent steps are based on the assumption that sufficient time is allowed on each step for the current to fall to the full load value. This means, of course, that if a starter is moved through its steps too quickly, higher current peaks will be obtained than those specified in B.S.S. 587.

Typical starting characteristics for a 100 h.p. slipring motor with a contactor type starter are given in Fig. 1, the dotted line indicating, for comparison purposes, the permissible starting current peaks for a 25 h.p. motor. These curves represent the starting conditions for a load torque of not more than full load torque throughout the starting period.

The permissible values of starting torque for liquid starters fall into a different category, and according to B.S.S. 140, an equipment up to 200 h.p. is permitted an initial peak of 100% full load current and a final peak of 150%. These values are only applicable providing the start-

*Chief Designer (Induction and Synchronous Machines) Laurence Scott and Electromotors Ltd.

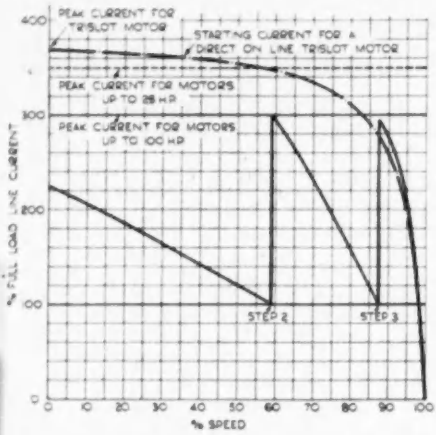
PEAK CURRENT FOR TRISLOT MOTOR
STARTING CURRENT FOR A DIRECT ON LINE TRISLOT MOTOR
PEAK CURRENT FOR MOTORS UP TO 25 H.P.
PEAK CURRENT FOR MOTORS UP TO 100 H.P.
STEP 2
STEP 3
% FULL LOAD LINE CURRENT
% SPEED

Fig. 1. Typical starting-current characteristics for a slipring motor with contactor type starter (starting torque not exceeding full load)
Dotted line shows permissible current peaks for motors up to 25 h.p.

ing torque does not exceed full load torque, and again the specification does not state values of permitted currents for higher values of load torque, but it is unavoidable that starting currents are approximately proportionately higher in such cases.

In any event, the current peaks during starting and acceleration are dependent upon the maintenance of the correct strength of the liquid and on the operator.

Single Cage Rotors

The characteristics of squirrel cage machines with single cage rotors will be briefly investigated to show to what extent they can be applied in practice. The starting characteristic of this type of squirrel cage motor varies considerably according to synchronous speed. Curve A of Fig. 2 shows a fairly typical curve for a range of 4-pole, 50-cycle motors of about 100/150 h.p., giving a starting torque of 100% with 6·0 times full load current when switched direct to line.

To obtain these values, it is necessary to introduce a moderate amount of "current displacement" effect (by the use of relatively deep and narrow rotor bars) and increased reactance in the design of the rotor winding. With a plain squirrel cage rotor (e.g., with round section rotor bars as commonly used for small machines) the torque/current ratio would be lower, unless the operational slip was considerably increased.

When such a starting torque is sufficient for the driven unit and the starting current is permissible for the power supply conditions, there would, on the face of it, be no great advantage in using any other type of motor, but there are, in fact, other considerations to which reference is made later.

Single cage motors can be arranged for other values of starting torque and starting current within certain limits, but this can only be done at the expense of other characteristics. To take a simple example, if a 100 h.p. motor as mentioned above was used for 75 h.p., the starting characteristics would automatically become 133% torque with 8 x full load current. As the motor would not be up to its permissible temperature rise at this lower loading, the rotor loss could be increased, again increasing the starting torque, but this result is obviously obtained at the expense of starting current, frame size (and,

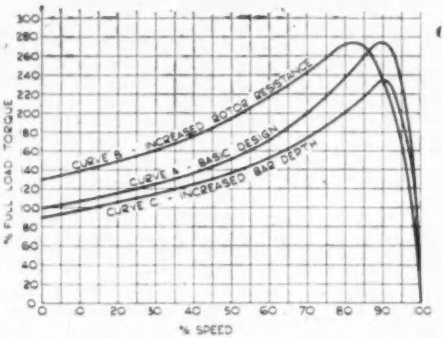

Fig. 2. Torque-speed curves for single cage motors

therefore, price), and running performance (as the motor is operating at only three-quarters of its normal load).

It should also be mentioned that, in accordance with B.S.S. 587, all types of starters for squirrel cage motors are based on a starting current not exceeding 6 x full load current direct switched. Starting currents in excess of this figure may, therefore, require a larger and consequently more expensive starter.

Curve B of Fig. 2 shows the effect of increasing the resistance of the cage winding (by the use of smaller bars or a higher resistance material). This provides a higher value of starting torque with a slightly reduced current, but the slip at full load is increased from 1·75% to 2·9% due to the additional rotor loss, which (apart from the reduced efficiency) would necessitate a larger machine to keep the temperature rise within permitted limits.

A further approach to the matter is to use still deeper and narrower section rotor bars which give an increased amount of "current displace-

ment" effect during the starting period. Curve C of Fig. 2 shows the characteristics of the same typical standard machine with a rotor bar of increased depth (but of the same cross section as in machine A), giving a starting torque of 90% with 5 x full load current. These improved starting characteristics are obtained at the expense of a slight reduction of overload capacity and power factor (due to increased reactance), and a somewhat less robust cage construction in view of the comparatively deep and narrow rotor bars.

Table 2 gives a summary of the performance of the typical single cage designs dealt with above, the figures relating to a motor of 150 h.p., the starting details being relative to direct switching.

Table 2. Technical Data for Single Cage Motors

	Curve A.	Curve B.	Curve C.
% F.L. Starting torque ...	100	130	90
% F.L. Starting current ...	600	580	500
% F.L. Pull-out torque ...	275	275	235
F.L. Power factor ...	·92	·92	·90
F.L. Efficiency %	93·3	92·2	93·3
F.L. Slip %	1·75	2·9	1·75

There are various other ways of utilising the "current displacement" effect with single cage rotors, by employing shaped rotor bars (for instance, deep bars which taper towards the top of the slot, or bars shaped like an inverted T). With rotors of this type the widest part of the slot is at the bottom, and to avoid excessive flux saturation at this point, the number of slots is usually restricted, with consequent slight adverse effects upon the performance of the machine.

Double Cage Rotors

To make the best use of the "current displacement" principle, and, therefore, to obtain the best possible starting performance, it is necessary to use a rotor with at least two electrically separate windings.

The basic principle of rotors of this type (frequently referred to as Boucherot rotors) is generally well known. At the instant of start, practically all the rotor current is carried by the outer (high resistance) cage, the high reactance of the inner winding preventing any appreciable proportion of current to flow in it until the motor accelerates. At full speed the rotor frequency and, therefore, the reactance of the inner (low resistance) cage is of a comparatively lower value, and this main winding carries the major portion of the running current.

It is, therefore, clear that the starting cage and the running winding can be adjusted independently within the limitations of the design.

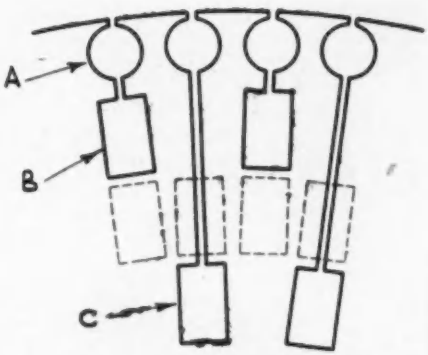

Fig. 3. Typical slotting design for a Trislot rotor

The cage resistance can be varied over a wide range by the use of different high resistance materials and sizes of bars, the running winding can be proportioned to give the required running performance, and the relative contribution of each cage to the starting effort can be regulated to a certain extent, depending on the details of the design principle, by adjusting the reactance of the inner cage by varying the width and depth of the slit connecting the two rows of slots.

It will be appreciated that, as the rotor current is mainly confined to the top cage during starting, the provision of ample thermal capacity is of importance.

Although all based fundamentally on the original Boucherot principle, there are in existence several distinctly different designs of double cage rotors.

The Trislot Rotor

An important development in "current displacement" type rotors is embodied in the Trislot rotor.

Instead of the usual arrangement of double cage rotors with two rows of slots (i.e., the starting cage on the outer periphery and the running cage winding on a smaller diameter), the slots are arranged in three rows.

Fig. 3 shows a typical slotting for a Trislot rotor, slots A accommodating the starting cage, and slots B and C the running winding consisting of short circuited turns in which each conductor in a slot of low reactance (i.e., near the periphery) is connected in series with a conductor in a slot of high reactance, the closed loops thus formed spanning approximately a pole pitch.

The slots shown dotted indicate the required position of the running winding slots to provide

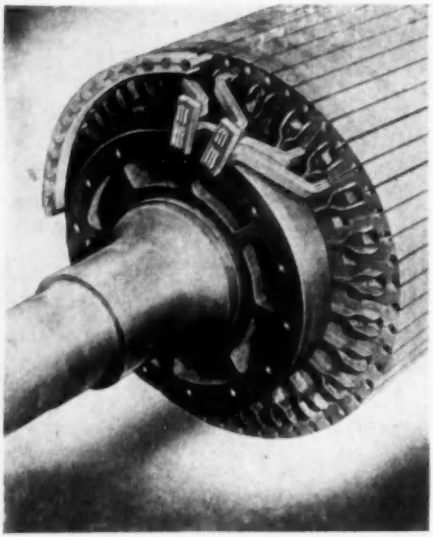

Fig. 4. Part of Trislot winding as used on 50-500 h.p. motors

the same average value of reactance for the running cage of the usual double cage arrangement.

It will be seen that such a design would not be possible owing to excessive flux saturation in the teeth, necessitating a different design and construction (for example, a reduction in the number of rotor slots) and mostly involving a bigger frame size than that required for a single cage machine.

Fig. 4 shows for illustration purposes a part of the winding of a typical Trislot rotor of the type used for a range of about 50 to 500 h.p. The outer cage is similar to that of a double cage rotor, and the required ohmic resistance is obtained by the use of a material ranging from copper to a nickel alloy having up to 60 times the resistance of copper, selected so as to obtain a bar section providing the necessary mechanical strength and thermal capacity. The bar ends pass through holes drilled in the end rings and are brazed in position, it being ensured that brazing occurs over the entire contact between bars and rings.

The inner winding consists of copper bars, insulated from the rotor core, the joints between the bars which form the individual loops being brazed together through substantial copper clips, the end windings eventually being held in position with bands of steel wire.

It will be readily appreciated that this arrangement removes the restriction of design already referred to, and high flux saturation at the bottom of the teeth is avoided. The low saturation thus obtained not only has a beneficial effect on the magnetising current, but ensures that the whole of the main flux during operation embraces all bars comprising the running winding, giving a low value of slip and correspondingly the highest possible efficiency and power factor for the chosen starting torque/starting current ratio.

The series connection between the low and high reactance bars of each turn ensures equality of currents in these conductors under all conditions and consequently an equal distribution of the M.M.F. around the periphery (important because of the secondary effects of unequal M.M.F. distribution) which cannot be obtained with a double or multiple cage design and reduced number of slots in the running cage (or cages).

Moreover, by shortening the pitch of the individual loops slightly, relative to the pole pitch, the influence of the higher field harmonics (especially the seventh) on the running-up torque is eliminated, the high resistance starting cage being, of course, not susceptible to their effect anyhow.

The combined effect of all this is to provide a smooth running-up torque curve without any danger of "crawling," combined with a minimum of heating losses during operation.

The freedom of design, obtained with the Trislot rotor, makes it possible to vary the characteristics over a wide range, and apart from the factors already mentioned, the design characteristics can be modified by choice of different pitches of the running winding.

Fig. 5 shows typical torque-speed curves for a range of 4-pole, 50-cycle motors of about 100/150 h.p., demonstrating the effect of the variations mentioned above, and Table 3 gives technical data for each curve, all figures being

Table 3. Technical Data for Trislot Motors

	Curves							
	A	B	C	D	E	F	G	H
% F.L. Starting torque	180	150	140	200	100	120	245	260
% F.L. Starting current	410	490	370	410	430	320	490	490
% F.L. Pull-out torque	190	270	190	190	250	160	205	200
F.L. Power factor ...	·88	·90	·88	·88	·90	·86	·88	·88
F.L. Efficiency % ...	93·5	93·6	93·5	93·2	93·5	93·3	93·5	93·3
F.L. Slip %	1·5	1·5	1·5	1·8	1·5	1·6	1·45	1·7

A: Basic curve for a typical machine.
B: As A, but decreased inner winding reactance.
C: As A, but increased outer cage resistance.
D: As A, but shorter pitch of inner winding.
E: As A, but increased outer cage resistance and decreased inner winding reactance
F: As A, but increased outer cage resistance and increased inner winding reactance.
G: As A, but decreased outer cage resistance and increased inner winding reactance.
H: As G, but shorter pitch of inner winding.

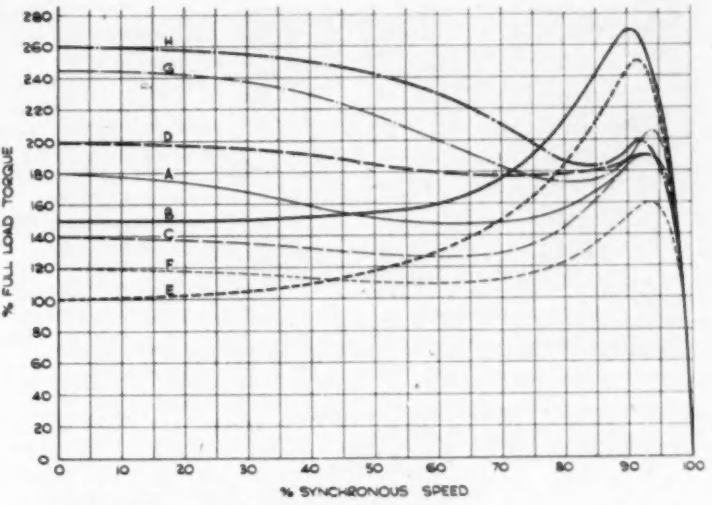

Fig. 5. Torque speed curves for Trislot motors

based on a motor having the same dimensions as for a standard squirrel cage motor.

It will be appreciated that these curves have been prepared to show clearly the effect of simple changes in the various features of the basic rotor design for a given stator, whereas in practice, other combinations of the shown characteristics are available. On small motors the range of characteristics available is to some degree limited by the necessity of standardisation, but on larger machines, due to the notching arrangements used for Trislot rotors, the variations can be utilised almost without restriction.

The curves shown in Fig. 5 are typical of the characteristics obtainable on 1,500 r.p.m. machines downwards, but at the lower speeds the values of starting current are, in general, lower than those given in Table 3.

Fig. 6 shows a finished Trislot rotor typical of the medium size range of motors, a similar construction being used for motors up to about 2,500 h.p. as shown in Fig. 9. Fig. 7 shows two views of a Trislot rotor as used on a smaller range of machines utilising a somewhat different method of main winding construction, a short circuiting ring being fitted at one end.

The present standard construction of Trislot motors has been developed after many years' experience of the manufacture of this type of machine, and comprehensive theoretical and practical investigations of all electrical, mechanical, and thermal considerations involved.

Considerable experimental work has also been done in connection with large 3,000 r.p.m. motors of up to about 1,500 h.p., where high thermal and mechanical stresses occur. A typical rotor is shown in Fig. 8, the end connections being protected with end bells.

Method of Starting

The usual methods of starting squirrel cage motors are star-delta, auto-transformer, and direct switching.

For a given machine, the initial current with star-delta starting is about one-third of the direct-on value, but it is frequently necessary to use a different rotor design for star-delta starting, so the starting current is not necessarily one-third of the value given for a motor intended for direct starting, e.g., a motor for direct switching with a starting current of, say, 3·6 times full load current may be chosen, whereas 1·5 or 1·75 times full load current (and not 1·2 times) may be preferred for a star-delta started machine, in order to obtain a higher value of starting torque in a star than a third of the value of the direct switched design.

The initial starting current peak with both star-delta and auto-transformer starting is, as a rule, appreciably less than with direct switching, and for motors with a light starting duty (e.g. centrifugal pumps and, in general, fan drives and unloaded compressors) these methods, in particular star-delta starting, provide a simple and effective means of starting with a reasonably low value of current. In both cases, however, two switching peaks

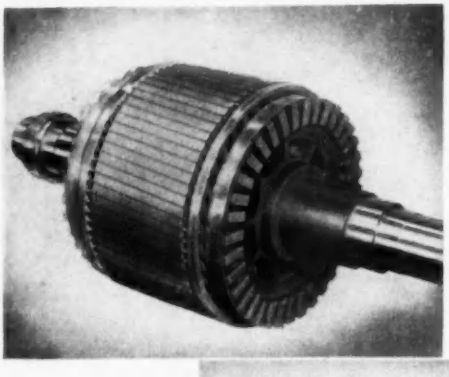

Fig. 6. *Above. Finished Trislot rotor for medium-sized machines*

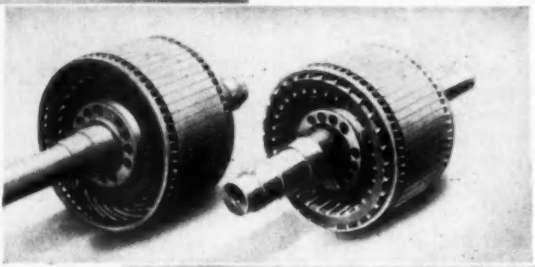

Fig. 7. *On left. Two views of smaller size Trislot rotors, showing short-circuiting ring at one end*

occur during the starting period as against one with direct switching. The current peak when switching over from star to delta (or from tapping to full voltage with an auto-transformer) depends upon the torque-speed characteristic of both the motor and the driven machine, and usually also on the operator. It should be borne in mind that, apart from the a.c. current peaks, an instantaneous transient surge occurs at change-over due to the interruption and reconnection of the supply, although it is possible to obtain special starters which prevent such transients.

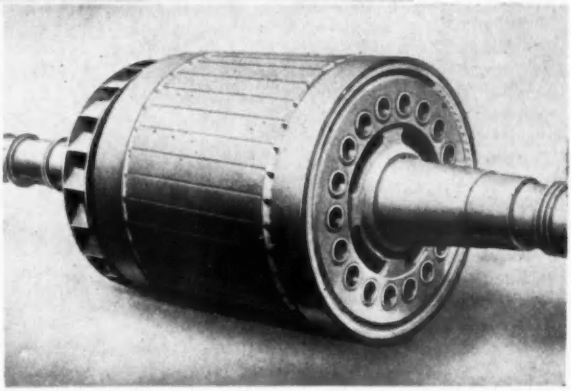

Fig. 8. *Trislot rotor for 1,500 h.p. 3,000 r.p.m. machine, showing end bells protecting the end connections*

The above points are not particularly objectionable on small motors, but on larger sizes, direct started motors are preferable from all points of view with the one exception of the higher initial current peak from standstill. The effect of this can, of course, be minimised by the use of a rotor chosen especially for low starting current which, as will be seen from the previous explanations, can be obtained by a suitable choice of design in combination with a sufficiently high torque for every kind of application, and with good running performance figures.

A further point worth mentioning is that direct switched motors permit the use of star connected stator windings (impossible, of course, with star-delta starting), which enables protection against single phasing to be provided in a simple manner.

In order to compare the characteristics of a direct switched motor of the Trislot type with those of a slipring motor having a comparable type of starter, a classification of slipring motor starters can be broadly made as follows:—

(*a*) Those requiring manual operation and, therefore, dependent to some degree on the skill of the operator to obtain the most favourable starting characteristics from the motor, e.g., hand-operated starters of the faceplate, drum, or liquid type.

(*b*) Automatic starters, normally of the contactor type, where the only manual operation is, say, the initial pressing of a push button, all subsequent switching being done automatically

A direct-on starter for a Trislot motor obviously falls, from every point of view, within the

Fig. 9. Trislot rotor for 2,500 h.p. machine

class of automatic starters, and on Fig. 1, which shows the starting characteristics for a slipring motor with a contactor type starter, is also shown the starting current characteristics for a typical direct switched Trislot motor. This shows an initial current peak of 3·7 x full load amps in accordance with design "C" of Table 3.

It can be seen that, apart from the standstill current peak, there is no very great difference between the direct switched starting current of the Trislot machine and the permissible currents of the slipring motor with a contactor starter (and these peaks are drawn on the favourable assumption that the starter is designed specially for the individual motor in accordance with B.S.S. 587, and that the timing of the contactors is correct). With smaller motors of up to 25 h.p., for which the permissible current peaks are shown by the dotted line in Fig. 1, the difference between the Trislot and slipring motors is even less pronounced.

It must be recalled that the current peaks shown for the slipring motors are applicable to a starting torque not exceeding full load torque, whereas the Trislot motor, for only a slightly higher value of current than shown in Fig. 1 will, if required, give a starting torque of up to 200% as can be seen from example D, Table 3. The table shows that for the same h.p. and frame size, the efficiencies of Trislot motors are at least the same as for slipring motors since they are equal to those of squirrel cage motors as given in Table 2, the power factors being only slightly less, depending on the starting current and torque required.

Summarising the points mentioned in favour of the use of direct started Trislot motors as compared with slipring machines:—

1. Lower price of both motor and switchgear.
2. Simpler and more reliable installation and, therefore, less maintenance required.
3. Smooth acceleration with only the initial current peak.
4. Starting performance entirely automatic and, therefore, not dependent on methods of operator, i.e., fully equivalent to automatic starting of slipring motors.
5. Smaller and lighter by the size and weight of the sliprings and their casing.

Apart from the utilisation of speed reduction by rotor resistance, there can hardly be any justification for the use of slipring motors. In this connection it will be realised that with this method of speed control the losses of the set increase at least in inverse proportion to the speed. The efficiency must, therefore, fall similarly more than in proportion to speed, irrespective of the torque required at lower speeds.

It may here be mentioned that Trislot rotors can equally well be used for pole-change machines for two or more speeds, using tapped or separate stator windings, allowing favourable designs for the different speeds by utilising the potentialities of the pitched rotor winding to the full advantage.

An advantage of Trislot motors, as compared with squirrel cage motors, which is sometimes overlooked, is that the considerably lower starting current facilitates the provision of effective

overload and fault protection, and in this connection frequently enables savings in cabling costs to be made.

It is hoped that this necessarily brief enumeration of technical considerations has shown that suitably designed motors with "current displacement" rotors can be used in the majority of instances where slipring motors are still specified, and that there is little justification for the regulations of many supply authorities, some of which specify slipring motors for anything over 5 h.p. (and even 2 h.p.) without due discrimination with regard to either the local supply conditions or the potentialities of modern designs of squirrel cage motors.

The author thanks the directors of Messrs. Laurence, Scott and Electromotors, Ltd., for permission to publish this article, and is indebted to Dr. B. Schwarz for advice given during its preparation.

Our readers' views . . .

Commercial Engineers

NO, "Carry On," I was not trying to impress you with my own duties but was just opposing a statement by you in your letter of the issue of April 6. I heartily agree with you that some Distribution Engineers are first class commercial men and I also agree with "Consumers' Engineer" that both Consumers' Engineers and Distribution Engineers are both *equally* necessary for the efficient working of a supply undertaking.

Your reference to the 1947 Electricity Act and the main functions of the B.E.A. surely leaves equal positions for both Consumers' Engineers and Distribution Engineers, the Consumers' Engineer to develop, the Distribution Engineer to provide and maintain, thus providing an efficient, co-ordinated, and economical system of electricity supply. Every piece of apparatus sold from Service Centres sells service and isn't service the main essential? The Consumers' Engineer is the link between the consumer and the supply authority in providing service and his department's activities cannot be assessed in "sales of apparatus and quick profits" so naturally I am not interested in your challenge.

From your letter it appears that you have knowledge that the Commercial Officer is attempting to dominate the Supply Engineer. I have no experience of this and the new schedule certainly does not endorse this opinion.

With your last paragraph I am in entire agreement so, in the meantime, shall we adopt your pseudonym and "Carry On."

T. W. Rice

MANCHESTER

Deptford in the Nineties

IT was out of respect for the pressure on your valuable space that I refrained from quoting in full my references in respect of the tests at Deptford.

The "speed, 52 r.p.m. and frequency 83" is quoted in "Alternate Currents in Practice," by Francis J. Moffett, B.A. (London), Whittaker, 1898, which is a translation of a work by Loppe and Bouquet.

In "Scientific Research and Electrical Engineering," by Dr. J. A. Fleming (Constable, London), we read, "in consequence of trouble with the flashing over from the copper strip armature to the field magnets, certain of the alternators were altered to reduce their generating voltage to 2·500."

There appears to be little doubt that direct generation at 10,000 V was pioneered, like so many other developments, at Deptford, and I am grateful to Mr. A. C. Eborall for much interesting information.

BROMLEY, KENT *E. H. Jesty*

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Darlington

I HAVE just noticed an error in your issue of May 4, page 716, regarding the year in which the first Darlington power station was started up, viz., 1907. I thought it worth while letting you know that my brother, Mr. J. R. P. Lunn, was appointed Borough Electrical Engineer there in 1900 and I think you will find that the station was started up either that or the following year. I think Messrs Kennedy and Donkin were the Consulting Engineers. You may be interested to know that my brother was 26, his salary was £200 p.a., the Lancashire type boilers were hand fired and the engines were non-condensing!

HUDDERSFIELD *D. E. Lunn*

Problems and Practice

IN ENGINEERING

Protection Against Restarting

THE following scheme was used in connection with a 25 h.p. 3 phase 400 V a.c. motor controlled by an oil immersed combined stator/rotor starter having no electrical interlocking contacts fitted. The relay, which must be manually re-set, was constructed from odds and ends such as can be found in any electrical repair shop (a commercially made relay using mercury switches could be purchased if required). The transformer was removed from one of the many types of low-voltage lighting devices (input 400 V single phase—output 12 V 4 amp).

In cases where a failure of the lighting system may take place, when the motor is running, thereby making it dangerous for any person working near running machinery, some difficulty may be experienced in locating the emergency stop switch. In order to overcome this difficulty an extra conductor could be run to each stop switch and a small pilot lamp (say 12 V 3 W) fixed on or immediately adjacent to the stop switch thereby giving a definite indication as to the exact position of the stop switch. This arrangement is shown on diagram by dotted lines.

The method of operation is as follows:—

(*a*) Close isolator thereby energising transformer primary winding. If the warning signals are in order they will operate.

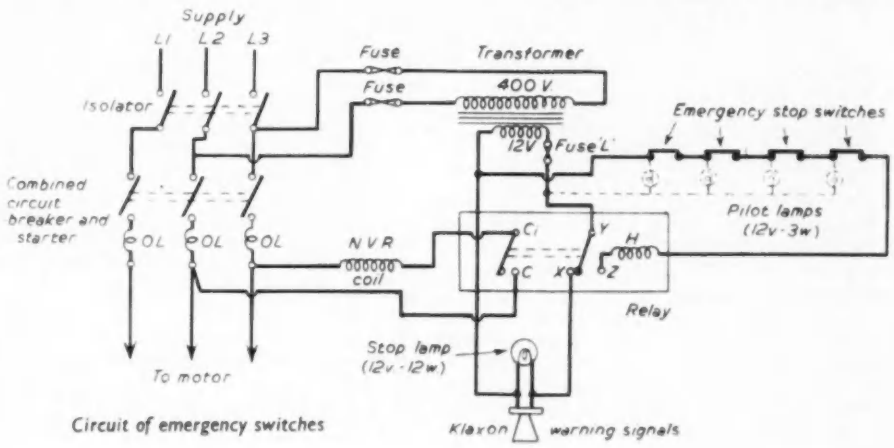
(*b*) Close relay (this must be done manually). Warning signals now become inoperative. If the emergency stop switches and associated wiring are in order the relay will hold in. If pilot lamps are fitted on the emergency stop switches then these lamps should light.

The fixed contact C and moving contact C_1 of relay are also closed, thereby completing the stator/rotor starter no volts release coil circuit.

(*c*) Start motor in the ordinary manner.

If an emergency stop switch is operated, then the circuit to the relay hold-on coil "H" is opened, thereby allowing contacts "YZ" to open and contacts "YX" to close. These latter two contacts complete the warning signals circuit. At the same time, the contacts "CC_1" are opened, thereby open circuiting the starter no volts release coil and stopping the motor. Under these conditions, the person responsible for the starting and stopping of the motor must open the isolator and stop the warning signals operating. On no account must he attempt to restart the motor before finding out the reason for the stoppage, i.e., on operation of warning signals the stoppage of motor must be treated as an emergency one and not that due to an overload.

If the motor stops due to an overload, the warning signals will not operate, but the relay re-setting device will indicate that it is closed. The person in charge will therefore know that



Circuit of emergency switches

the stoppage is due to an overload only.

In the event of either h.t. or l.t. transformer-fuses blowing, when motor is running, the motor will be shut down but the warning signals will be inoperative. The relay re-setting device will, however, indicate that it is open and the person in charge must report the trouble and have this rectified before attempting to re-start the motor.

The following advantages are to be gained by adopting the above scheme:—

(1) Discriminates between motor tripping out, due to an overload and being stopped due to an emergency.

(2) Can be incorporated in any motor circuit irrespective of whether or not the starter is fitted with electrical interlocking contacts.

(3) Can be used with any type of emergency stop switch.

(4) Emergency stop switches can be tested without having to run the motor.

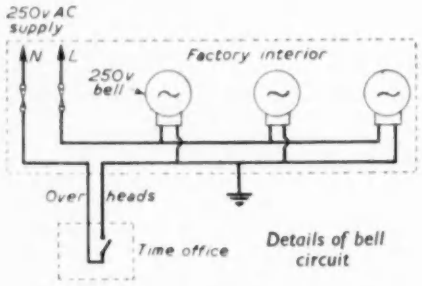
(5) Low voltage only applied to stop switches.

(6) Easy to make and install with a negligible cost.

(7) Fails to safety.—*E. A. Robbins.*

Unexpected Ringing

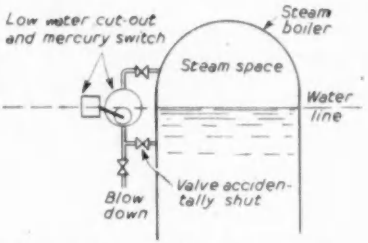
DURING a heavy downpour of rain a group of 3 warning bells in parallel controlled by a single pole switch from a timekeepers' office suddenly started ringing at an unusual



time. I naturally thought the switch had been knocked on accidentally but discovered on enquiring that this wasn't the case. I inspected the switch internally and found it to be open. As the switch feed and switch wire running to the timekeeper's office were overheads running one above the other, and exposed to weather conditions, and with bare line tappings, I thought the rain might be playing a trick. After withdrawing both fuses and disconnecting wiring from first bell, the Megger reading between switch feed and switch wire was 20 megohm thus ruling out my initial suspicions. I then went to the second bell and found that a lead covered cable looping the two bells had its neutral earthing on the lead covering just where the lead had been trimmed off the cable. This led me to suspect the polarity of the circuit and sure enough the neutral had been run to the control switch.—*W. Adam.*

A Boiler Cut-out Failure

AN oil fired boiler which was electrically controlled had been running continuously for several days, when it was shut down for a few hours for work on the oil unit. On attempting to restart the oil unit would not operate. A routine check was then carried out, including an examination of electrical pressure, switches, contactors, and preheater controls. It was then decided to examine the float operated low water cut-out, although assured by the stoker that nothing had been touched since the boiler was shut down.



Valve positions and low water cut-out

The mercury switch was checked and it was seen that the contacts were open, although the boiler water-line was well up the gauge glasses; further investigation revealed a closed valve to the water space.

This valve had probably been closed for some time; but the fact had not been revealed because water was trapped in the cut-out chamber, thus holding up the float.

After the boiler was shut down a vacuum gradually formed in the steam space causing the water to be drawn up out of the cut-out and allowing the float to drop, thus preventing the boiler from re-starting.—*W. H. R.*

Contributions to this page, dealing with specific problems and items of interest to practical engineers are welcome, and will be paid for at our standard rates. Items should be brief, written on one side of the paper and preferably accompanied by diagrams or sketches, which will be redrawn for publication. Contributors should state whether or not their names are to be published if their notes are accepted.

Contractors at Hastings

Business is combined with Pleasure at the E.C.A. Fifteenth Annual Conference

MORE than 500 delegates and visitors attended the annual conference of the Electrical Contractors Association, held at Hastings from Wednesday to Friday of last week.

Above. At the presidential reception. The president-elect (Mr. P. G. Wallis) being greeted by the Mayor and Mayoress, Mr. Dickinson and his consort

Above: Mr. and Mrs. R. L. Lowe of Oxford

On left, Dame Caroline Haslett and Sir Montague Hughman

Below: Mr. L. C. Penwill chats with Mr. W. H. Smith of Manchester

Below: Youngest delegate? Miss Margaret Purcell, from Gainsborough, with her father

Following the council meeting, earlier in the day, the "public" part of the conference commenced with a reception by the president, Mr. S. Dickinson, ASSOC.I.E.E., supported by the Mayor and Mayoress of Hastings. Miss M. Dickinson, who was to have received the visitors with her father was unfortunately unable to be present, and her place was taken by Mrs. P. G. Wallis, wife of the president-elect. Dancing continued until midnight.

Thursday's proceedings opened with a civic welcome by the Mayor (Councillor J. D. Cooper, J.P.), followed by the presidential address, and the main technical paper of the conference.

During the course of the morning, flowers and a telegram of sympathy and good wishes were sent to Mrs. S. Dickinson whose illness had rendered it impossible to be present.

IN his Presidential Address, Mr. SIDNEY DICKINSON, ASSOC.I.E.E., recalled his speech of a few months ago at the annual dinner, when he deplored the intrusion of politics into commercial life. He felt that salvation in this direction lay not so much in public speeches and declarations of faith as in positive individual and collective action. Determination was required on the part of all responsible citizens to rid industry of politics and restore the opportunity of even more successful competition in world markets.

The President addressing the Conference

Although it was true that Britain could not succeed without her export trade, and great strides had been made, he believed we should eventually suffer for the Government's policy which almost completely neglected the home market. One wondered, too, how long our success in the export field would continue under penal taxation, against competition from Germany and Japan. Reluctant as he was to drag in politics, it was essential that adequate thought should be given to the economic problems. While opposed to any suggestion that labour costs should be reduced by wage cutting, he would like to see the wage packet a more accurate reward for initiative and effort, and reflect more closely the cost of living. He felt that the Welfare State was doing grievous harm to the independent spirit of the British people as a whole. Initiative was being crushed and would continue to be so long as the individual was prevented from enjoying the reward of his own effort.

Relations with the B.E.A.

During his term of office, the E.C.A. had concluded its agreement with the B.E.A. regarding relationship with the contracting industry, and they were hoping shortly to have a discussion with the B.E.A. regarding certain features of the Area Board accounts. Relationship between the E.C.A. Committees and Area Boards were most cordial, and the regular meetings which were held would do much to implement the good relationship.

There was a need to establish a national "yardstick" regarding installation practice—an installation which was considered satisfactory in one area might not be acceptable in another. He hoped that a standard code would be established at an early date. The same applied to tariffs—even if a national tariff were not forthcoming, he hoped that some rationalisation of existing practice, with its scores of different tariffs in each area, would be possible.

Another matter which was causing some concern was the discrepancy between working conditions in independent contractors and in the contracting departments of the B.E.A. The contracting industry has regulated wages and working conditions through the medium of a N.J.I.C., and the B.E.A. policy would, he believed, have serious consequences which might eventually lead to a breakdown of the negotiating machinery of the industry.

No "Closed Shop"

On the question of compulsory registration, the President pointed out that the subject had received consideration by the Working Party for the building industry, who unanimously recommended that some form of registration in the electrical trade is desirable. The E.C.A. were not desirous of a "closed shop." It was, in fact, anxious that anybody should be allowed to practise in the installation field, so long as they could qualify to the satisfaction of an independent body, this being necessary for the protection of the public.

The introduction of the B.E.A. into the trading sphere had necessitated the reviewing of the industry's trading structure, which had never been static. Regarding trade discounts, he felt that these should be based on service performed, and extra service, in quantity buying and stocking, should be rewarded by quantity discounts based on a fair assessment of the saving to the manufacturers.

Reviewing the Fair Trading Policy, he pointed out that it attempted no more than to reflect what was mutually acceptable to its constituent member Associations, and it was up to the members to co-operate even more closely than in the past and for the individual members of the Associations to abide loyally by the decisions made on their behalf. An Association must reflect the wishes of its members and the only basis for success was service by the Association to its members, and loyalty by the members to their Association.

Reviewing briefly the organisation of the industry he pointed out that the E.C.A. dealt with technical, legal and matters of general commercial interest, the N.E.C.T.A. provided the channel for trading negotiations, while the N.F.E.A. was an employers' trade union, representing them on the N.J.I.C.

While the N.F.E.A. had endeavoured in conjunction with the E.T.U. to keep pace with industrial changes, the past year had not, unfortunately, been free from strife. His personal view was that many troubles did not arise from legitimate industrial grievances, but from political motives. In their relationship with the E.T.U., as with other sections of the industry, it was vitally necessary that there should be mutual goodwill—there should be a just and equitable examination of all opposing claims, and decisions based on merits of the case. Political considerations should be outside the jurisdiction of Associations. The past year had been full of activity. Many problems which had been with us for years were still unsolved—in fact, the expansion of the industry seemed to emphasise the problems, rather than solve them. The success of the electrical industry depended directly on the service rendered to the public, and he was anxious, today and for the future, that all sections should combine in a mutual respect of each other's point of view. In conclusion, he hoped that the day would not be far distant when this country would emerge from its difficulties and we should all participate in the prosperity which was the due reward for individual effort.

Trends in Contracting

ON the Thursday, Mr. S. L. M. BARLOW, ASSOC.I.E.E., read a paper entitled "Trend in the Development of New Techniques in Electrical Installation."

Mr. S. L. M. Barlow

For many years the valuable part played by the qualified contractor in the electrical industry was not always fully recognised by the I.E.E. In course of time, his status became established, the seal being set by the formation of the Installations (now Utilization) Section. Since no industry could succeed without commercial enterprise expanding alongside technical progress, the formation of the E.C.A. in 1901 was a natural development.

There were a few members who joined for their own personal gain, but they were in the minority and the E.C.A. had steadily built up a sound trading and labour structure within the industry and established a standard of ethics in trading practice to match the technical achievements brought about through the I.E.E.

Few major technical developments in installation work had been put into practice during the war period owing to the acute shortage of materials; in fact it had often been necessary to revert to obsolete methods such as cleat wiring. In other respects the war had been responsible for a number of interesting ideas which had been developed on commercial lines and formed the spearhead of some new techniques. The value of individual wiring contracts reached such large figures that the contractor had to review his methods and introduce improvements such as the more extensive use of plant on site, and more exact methods of costing and estimating.

Plant and Equipment

One of the main reasons for the influx of unqualified competition into the industry (which was an argument in favour of compulsory registration) was the erroneous idea that very little plant was required to set up as a contractor. The ingenuity of manufacturers, in such matters as the provision of "knock-outs," had reduced the demand for plant. Nevertheless, there was a wide field for develop-

ment in this respect, due to the rapid rise in labour costs.

There was, for example, need to overhaul ideas on conduit threading equipment, and he reviewed various methods including a die driven by an attachment to a heavy duty drill. The days of the wooden bending block too, were over, and mechanical benders were firmly established, both hand and operated by compressed air or hydraulic means. In the case of large installations where hundreds—or even thousands—of bends of one shape are required, there should be a possibility of developing a machine which followed a template like a profile cutter.

Portable mechanised tools offered scope for development towards speed of operation; quick release drill chucks and flexible drives were examples of this. A combined hydraulic bender and hole-punching equipment was another development recently marketed in the U.S.

Ladders and scaffolds had always, of course, been of importance to E.C.A. members. Recent developments which had considerable possibilities included a hydraulically-operated platform extensible to 17 ft high with controls from the platform itself; a telescopic ladder rotatable on a base; and a form of scaffold rapidly assembled without the use of nuts and bolts.

Labour

Without the co-operation and skill of the operative, the development of new techniques would be difficult. It was undoubtedly due to the happy relationship existing between employers and employed that such encouraging progress had been made in the industry. The introduction of compulsory registration with further development of apprenticeship training for site and office work would lead towards speedier development in every direction.

The formation of N.J.I.C. and the Area Industrial Councils had gone a long way to ensure smooth working, but the future trend should be to include employees of both contractors and the B.E.A. in one N.J.I.C., in order to remove anomalies. There had been long discussions on the possibility of introducing incentive schemes but, due to diversity of work, it had been found impracticable.

Standardisation

There was still much to be done in the field of standardisation, and the author instanced fire bars and fuse bridges as examples. Apart from the standardisation of materials there was much to be done in the field of rationalisation of installation practice, and the use of s.p. fuses on a.c. supplies was something which might be cleared up now that the supply industry had been nationalised.

Wiring Systems

Development in wiring systems over the last few years were then briefly reviewed, including mineral-insulated copper sheathed conductors, and the grid suspension system which, with its centrally disposed catenary wire, replaced original catenary systems, making a much neater job.

Aluminium conduit had proved reasonably successful, apart from its cost, which was about the same as heavy gauge solid drawn steel. Threading was not easy and required good dies of the self-clearing pattern. There had been much controversy about electro-chemical effects, but aluminium and zinc alloy fittings had resolved this.

Insulated tube systems, flexible conduits and copper conduits were also reviewed, the author remarking that there were two variations of the latter, heavy and light gauge, the latter using soldered joints to alloy fittings. Heavy gauge copper cost about twice as much as heavy gauge steel, but it had many specialised applications.

The rise in popularity of metal duct systems was noted. There was little doubt that the system had many valuable features in adaptability and convenience. It was, however, pointed out that the extended use of trunking, particularly when not filled full of cables, tended to increase the fire risk. Underfloor fibre ducting was also reviewed.

The relative advantages of copper and aluminium for solid busbar systems were reviewed, and particular stress laid on proper jointing methods for use with aluminium. It was pointed out that bright aluminium would carry some 20% less current for the same temperature rise as it would if painted dull black. The increase of busbar distribution systems with fused tapping points was noted. These systems were admirable from the standpoint of flexibility but, in the author's opinion, there was still room for improvement, particularly for factory distribution with large numbers of f.h.p. motors, and he referred to an American system in which the trunking system was only 3 in. wide by 2 in. deep, with plug-in arrangements every 20 in.

Accessories and Appliances

The combined control unit single pole fusing and microgap switching, coupled with a more realistic attitude on the part of supply authorities, had done much towards solving problems

of space for intake switchgear. Relatively few really new accessories had been brought out in the last few years, but ingenious and functional design had made great strides.

Fluorescent and tungsten lighting were briefly dealt with, the author being of the opinion that there was scope for better protection, both electrical and mechanical, in the field of high-voltage fluorescent lighting. On the subject of tungsten lighting a little-known specialised system of spotlighting pictures and *objets d'art* was discussed.

Mention was made of the decline in the seller's market for appliances and the consequent disappearance of shoddy apparatus. Trend in the appliance field was towards functional design. Supply limitations had tended to concentrate attention on low-loading devices, but space and water heating would come into their own once more.

Progress in the industry was encouraged to a large extent by the architect. Now that he was evolving new methods of construction, it was important that the industry should appreciate this trend, and endeavour to match their design with that of the architect, rather than try to fit present systems to new forms of construction. It was essential for the contractor to be capable and willing to provide a first-class technical service to the architect. This would benefit the industry as a whole.

Regarding the future, he would not attempt to make an accurate forecast. The contractor was intimately linked with the considerable research being carried out into new applications of electricity. Whatever the outcome of that research, he felt that the contractor would be fully occupied for some time to come.

Discussion

The discussion on Mr. Barlow's paper largely consisted of detailed technical comments, although several items of general interest were raised. Emphasis was laid on the importance of membership of the I.E.E., and it was a matter of regret and a weakness of the industry that so few contractors were members.

There was a very definite feeling that something should be done about the anomalies between the B.E.A. and private contractors regarding rates of pay and working conditions.

Amongst a section representative of the smaller contractors, it was considered that many of Mr. Barlow's recommendations, while excellent for large contracts, were impracticable elsewhere. Plant described would be uneconomic for small jobs, while the methods of stock control, mechanised accounting, and drawing-office work advocated would be beyond the scope of the small contractor.

On Thursday evening delegates and visitors were entertained by the Mayor and Mayoress to a reception and ball at the White Rock Pavilion.

Friday morning, the E.C.A. held their annual general meeting. Later, Mr. P. G. Wallis, the new president, was formally installed (see Personalities).

Lord Citrine Speaks

Speaking at an open session on Friday, Lord Citrine recalled his early days as an apprentice in the electrical contracting industry at 2s. 6d. per week. Pointing out that he was still a member of the Electrical Trades Union, he replied to recent speeches which had been made regarding "embarrassment" which his membership caused. He was proud of his 39 years' membership—mostly spent in active constructive work, in which he had had a great many opportunities to prosecute ideals in which he believed.

To continue as a member of the E.T.U. was no embarrassment whatever to him, so long as that union confined itself to legitimate trade union activities. "I would not be so happy," he said, "if that union lent itself to subversive political propaganda, whether emanating from Moscow, or London, or anywhere else."

"Speaking not personally, but in my other capacity," Lord Citrine said later, "I say, without qualification, that I shall always do my best to support the Trade Union movement, and the properly organised associations of employers. As a trade unionist, I have always advocated that, if collective bargaining was to be free from State intervention, it must necessarily rest upon good organisation on both sides. I have no time for the man who takes the benefits of collective bargaining, whether he be a worker or an employer, if he does not contribute to the carrying on of that well-tried and available system of adjusting industrial relationships."

Regarding relations between the B.E.A. and private contractors, he believed in the principles of fair competition. The advent of the B.E.A., so far from menacing the broad interests of the Association's representatives would, in no small measure, consolidate and develop those interests.

Finale

Following the garden party at Crowhurst Park, conference came to an end on Friday with a smoking concert followed by dancing.

NEW LITERATURE

The British Journal Photographic Almanac, 1950

edited by A. J. Dalladay

THIS well-known photographic almanac contains this year several articles devoted to colour photography. Although in general the electrical industry as a whole is not so interested in colour work, yet photographic processes are playing an increasing part both as research tools and as recording and measuring mediums. For this reason the sections on plan copying and recording and oscillograph recording are of interest. The usual review of new items of photographic equipment is given, as well as an epitome of progress. This latter again shows the concentrated work being put in on the development of colour processes.

Other chapters deal with chemicals and chemical formulae, document, copying and many tables are included giving exposures, optical calculations, lens data, hyperfocal distances, depth of field, etc. A 32-page pictorial photogravure supplement is given. Published by Henry Greenwood and Co. Ltd., 24 Wellington Street, W.C.2, 560 pages, 7¼ in. by 5 in. Price 5s. (paper board covers); 7s. 6d. (cloth bound).

Wireless and Electrical Trader Year Book

THIS hardy annual follows the pattern of its predecessors, in the presentation of business information and other data applicable to the industries. As before, it includes trade addresses, associations, a classified buyers' guide and a list of proprietary names, which continues to expand, and in addition to the usual details of received specifications, similar information is included for television sets, and c.r.t. for the first time. The old list of towns and their mains voltages has been discontinued however, nevertheless, dealers will find this edition good value for money. Published by the Trader Publishing Co., Ltd., Dorset House, Stamford Street, S.E.1, 278 pages, 5½ in. by 8¼ in. Price 10s. 6d. post free.

Supply Section Conversazione

An Interesting and Enjoyable Evening at the Institution

WELL attended by members and their ladies was the Supply Section Conversazione held at the I.E.E. last Wednesday night, and special attention had been paid to the task of making the function interesting from a feminine, as well as a masculine viewpoint. The film show, lasting for an hour, included two excellent colour films on the building of the Sutton Coldfield television mast, and the erection of the steel structures for the overhead 275-kV line at Leatherhead; a monochrome film dealing with the use of Thyratrons for industrial control processes and two films of general interest.

Exhibits

As was only to be expected a singularly wide range of equipment was on view. Of these, the most impressive was a sectioned scale model of a 28,000 kVA feathering propeller hydro-electric set built for the Tekapo installation of the State Hydro-Electric Department of New Zealand. This was a working model and showed clearly the action of the blade feathering equipment. Considerable amusement was caused by the electro-encephalograph which frequently found itself overloaded by electrical impulses derived from the "laughing" face muscles of the subjects.

Transmission troubles were illustrated by a model demonstrating the working of a surge generator for 400 kV, for use in conjunction with an insulator and a surge diverter. Although comparatively small in size this exhibit proved capable of giving a remarkably hefty spark.

An interesting variant of the "try your strength" machine was provided by a grip tester consisting of a "U" shaped bar with a resistance strain gauge fitted on the bend. The distance apart of the two arms of the "U" being about two inches, it was possible to force them slightly together in one hand. Unfortunately, the sensitivity of the strain gauge was somewhat high with the result that most members were able to drive the needle of the output meter off the scale.

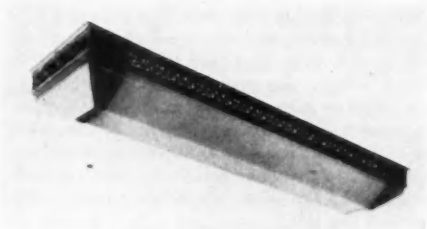
Social Side

The social side of the evening was well supported. Mr. J. W. Leach, chairman of the Section, received members and guests in the library, which was, as usual, the focal point for people to gather and chat—being the place where food and drink were available—and for the first time, dancing, under the direction of Mr. P. K. Davis, was allowed in the common room and tea room. Although the floor was never crowded, many people availed themselves of this facility. It was generally held that the evening was an unqualified success and the Supply Section is to be congratulated on putting on such an excellent show.

House of Commons Lighting

Specially Designed Fittings to harmonise with the style of the Reconstructed Building

TRADITIONAL design, allied to modern practice, characterises the construction of the lighting fittings now being manufactured for installation in the new House of Commons. Owing to the complexity of the building, which is a maze of rooms and corridors, many difficult problems of lighting arose which did not prove amenable to uniform treatment, and although standardization of fittings was adopted as far as possible, a considerable number of different designs were found necessary.



Overhead fitting of cast bronze and Perspex

General Fittings

A type of design used throughout the House is in the form of a ceiling fitting to house up to four fluorescent lamps. The exterior consists of a fretted bronze frame, to which is attached a Perspex diffuser screening to the lamps and interior. In order to ensure easy and rapid replacement, the lamps and associated control gear are mounted complete on a sub-assembly which is suspended by nylon cords from eyelets within the bronze frame, the leads being connected through a plug and socket. Thus, in the event of trouble, the whole unit may be removed and a spare substituted in a minimum of time. All items of the control gear, which is of the instantaneous start type, have been designed and supplied by the General Electric Co.

Special F.ttings

In many cases the fittings have to combine the dual functions of lighting and also have to provide outlets for the air-conditioned ventilating system. In the more elaborate types, adjustable vanes are provided to allow control over the air flow.

A simpler form of this dual arrangement is used in the telephone kiosks—of which there are over one hundred.

More elaborate are the wall brackets and hanging lanterns designed mainly for use in the Cloisters. Both of these are of the panelled type and are suited to the Gothic architecture of the surroundings. The decorative tracery of the cast bronze panelling is backed by lightly-tinted laminated glass, which enhances the unlit appearance of the fitting and yet gives a pleasant diffusion of light.

In the more important rooms, handsome table standards will be used, the pillars being made of carved oak with a bronze hood, lined with an anodised aluminium reflector. Owing to the weight of the hood, the base has had to be specially weighted to ensure stability.

The external metalwork of all designs is real bronze (mostly cast) and it is polished a satin finish and left unlacquered. This combination of metal and finishing is artistically satisfactory and eliminates the inconvenient necessity of the later refinishing which follows the more usual method of metalwork artificially coloured and lacquered.

In conclusion, it was most interesting to see the combination of modern technique and practice, and traditional hand-craft used at the factory on this specialised and difficult work. Our thanks are due to Mr. Ben Ansell and to Falk Stadelmann and Co. for the information given in this brief article.

Bronze and oak table lamp and Gothic design for the Cloisters

Notes on Wiring
by MEGOHM

The Twelfth Edition

Some Notes on the Revised I.E.E. Regulations

I HAVE now had an opportunity of studying in greater detail the latest edition of the Wiring Regulations, extensively reviewed in the ELECTRICAL TIMES, dated May 11, and although one cannot but praise the thorough and efficient manner in which the work has been carried out, I cannot but regret that the opportunity was not taken to rearrange some parts so as to avoid some of the many cross-references. Another matter which I had hoped would be dealt with was the inclusion of a short section, complete in itself, covering small installations of the private house type, but perhaps this may follow at some future date.

It is a sad reflection on the times we live in that it has been found necessary to increase the price from 1s. to 3s. 6d. for the paper bound edition, and from 1s. 6d. to 5s. for the cloth edition, and I fear that this considerable rise in cost will, to some extent, curtail the circulation. When for years we have preached that all wiring should conform to the regulations and every specification and application form for a supply insist upon absolute compliance, then the regulations become semi-official in character and status, and should be readily available to all interested persons at a more or less nominal price.

Codes and Standards

For the first time the Codes of Practice are mentioned, and it is pointed out that they offer guidance on good practice, and in consequence deal with many subjects referred to in the regulations proper. At first glance it may seem strange that no tabulated list of the relevant codes is given, but the reason probably is that any such list would very soon be out of date, due to the large number of codes which are being produced. From time to time I have dealt with some of these and expressed some doubt as to their practical value. To my mind we are rapidly reaching a stage when it is a wholetime occupation to read and digest, let alone memorise and comprehend, all the various acts, orders, rules and regulations, etc. which are considered necessary for our guidance, safety and welfare, with the inevitable result that many of us give up the struggle.

The B.S. specifications are not quite in the same category so far as the wiring contractor is concerned, although no fewer than 93 are listed in the present edition of the regulations compared to a mere 68 in the eleventh edition.

Suggested Layout

Without taking unto myself the mantle of a prophet, I can foresee the time when it will be considered both expedient and necessary to simplify the present system by incorporating the codes as a separate section of the regulations, and I can see no practical reason why this should not be the best solution to our problem.

With this arrangement, the first section would deal briefly with wiring practice, discussing the advantages and disadvantages of one system or method as against others, and include a few pertinent diagrams to simplify or explain the text.

The second section would contain the regulations proper, and should in my view include a brief "minimum requirements" section for the small private installations, as suggested above. As we are indulging in the modern pastime of planning and reconstruction, let us go the whole way and have a loose-leaf system of binding, and a greater subdivision of the various sections, thumb indexing, and even various colours for the pages of different sections.

I am glad to note that the 12th edition in fact shows a very slight inclination towards the principle of a "how to do it" section, inasmuch as the "General" regulations have been considerably amplified and set out briefly the considerations behind the regulations.

Even the hallowed words ". . . as to prevent danger so far as is reasonably practicable," first used, I believe, by the late G. Scott Ram in the original Home Office Regulations, are now to be found in this general section, and it is therefore not such a farfetched idea to suggest that an "explanatory memorandum" should be included for our guidance. Perhaps the powers that be will reflect upon the above matters when once again they assemble after their present well-earned vacation.

Lighting Fit for an "Empress"

Completely refitted, the C.P.R. liner "Empress of Scotland" returns to the North Atlantic run. Her redesigned installation creates a new standard in ship lighting

EXTENSIVE use of Osram cold cathode filament lighting is a feature of the new lighting system installed by G.E.C. in the 27,000-ton Canadian Pacific liner, "Empress of Scotland." Over 5,000 ft of cold cathode tubing has been used forming what is believed to be the largest installation of its type in any ship in the world. Except in feature fittings, such as the cocktail bar, where exposed coloured tubes are used, the fluorescent lighting is unobtrusive. The principal aims have been to secure high lighting efficiency and even illumination, and to reduce heat dissipation which would otherwise have to be dealt with by the ventilation or air-conditioning system.

Particular care has been paid to the avoidance of colour contrast between the cold cathode and tungsten illumination so that no marked impression of a change in colour is received when passing from an area lit by cold cathode tubes alone to one where all the lighting is provided by tungsten lamps.

Cold cathode lighting in the main dining room

The cold cathode lighting for general illumination comes from a combination of Osram Gold and Ivory tubes, installed behind white flashed opal glazing.

In the main dining-room on "C" deck, the cold cathode tubing is contained in three tiers of continuous glazed cornices running round three sides of the ceiling, well above the main area; a total of about 1,500 ft of tubing being employed. The "C" deck foyer is lighted by 190 ft of cold cathode tubing in glazed cornices and in ceiling fittings and the same form is used in the cocktail bar and the lounge. The promenade deck uses cold cathode lighting in cornices, together with the card and writing rooms, the children's room and the tourist dining saloon.

The total number of cold cathode and tungsten fittings is approximately 600, and over 1,200 Osram filament lamps are used.

Cold cathode ceiling feature in the cocktail bar

Power Supply

Two 75 kVA motor-alternators have been installed in the engine room to convert the standard ship supply of 220 V d.c. to 230 V, 50 c.p.s., a.c., for the cold cathode lighting. One machine only is in service at a time, the other being used as standby. Each is equipped with a belt-driven exciter, and G.E.C. has also supplied starters and output voltage regulators.

Tungsten lighting in the 1st class smoke room

overseas news

Work in Hong Kong

Most of the boiler plant at the generating station of the Hong Kong Electric Co., Ltd. had been converted to oil firing, the chairman, Mr. J. D. Alexander, stated at the annual meeting recently. This had resulted in economy in operation, and it had been decided to reduce charges to consumers by one cent for lighting and two cents for power, bringing the rates down to approximately double the prewar figures. The peak load during 1949 had increased to 30,000 kW, despite shortage of plant, against 21,800 kW in 1948 and 20,800 kW prewar. Preliminary work in connection with the generating extension is in plan and the scheme should be completed by 1953. The undertaking's commitments for plant and machinery, standing at £760,000 sterling, covers three new boilers totalling 400 klb/hr capacity, two turbo-generators aggregating 35,000 kW, and the attendant distributors.

S. A. Acquisition

The Port Lincoln electricity undertaking, South Australia, which has been operated by the Government Produce Department, has been purchased by the Electricity Trust of South Australia, for £50,000. The existing plant consists of two 440-h.p. National heavy oil engines coupled to 250 kW B.T.H. alternators, two 240-h.p. Blackstone engines coupled to 150 kW English Electric alternators, and one Belliss and Morcom 530 h.p. oil engine coupled to a 300 kW alternator. As the station is not capable of further expansion, the Trust is negotiating with the Port Lincoln Council for a site for a steam station. As a temporary expedient, it is proposed to install diesel plant near the site of the proposed power station, to cope with increasing demands in the next year or two.

A Trade Mission

A French Trade Mission is currently visiting Australia, to try to obtain orders for materials and equipment for the Snowy River hydro-electric scheme, among others.

Melbourne-Bendigo Line

The State of Victoria Parliamentary Public Works Committee has now been instructed to investigate whether electrification of the Melbourne-Bendigo railway line is justified, having regard to the present and prospective traffic.

A Plan for Sydney

In an effort to boost electricity supplies, Sydney County Council, N.S.W., is arranging to recruit private firms to supply power during peak hours. Approach is being made to 17 firms who have their own generating plants. If arrangements are completed, it is estimated that the assistance gained from these plants would be 6,000 kW by June, increasing to 8,900 kW by September.

Two other organisations may supply 10,000 kW by the 1951 winter, if the plants now under construction for supplying their works with power and steam are completed in time.

Velox Boilers at Sydney

This month the first of the two Velox boilers will be put into operation by the Sydney County Council at Bunnerong power station. This has been so adapted that it can be switched to feed either of the "A" or "B" sections of the station, which normally operate on steam at 350 lb/sq in. and 650 lb/sq in. respectively.

Development at Winnipeg

Closely approaching the ultimate target set by the large power utilities in the U.S.A., the average annual consumption per domestic consumer on the Winnipeg Hydro-electric system last year was 6,421 kWh, compared with 6,245 kWh in 1948. Total sales of electrical energy by the undertaking amounted to 707 million kWh in 1949, according to the annual report just received. An order has been placed for a 15,000 kW steam turbine for installation in the city's plant on Amy Street, scheduled for operation at the end of 1951. This will bring the station's capacity to 25,000 kW. Indicative of the increasing number of domestic appliances in use, and to some extent of the automatic devices incorporated in modern apparatus, the Appliances Service Division carried out 36,300 jobs in the year—a record. Appliance sales amounted to $689,000 against $791,000 in 1948.

Progress in Nova Scotia

More than 20,000 rural homes were now being supplied with electric power, Premier Macdonald told Legislature members last month as the Committee on Supply passed a resolution of $393,750 for the Nova Scotia Power Commission. Part of this sum will be used for extension of the government's rural electrification programme which was commenced in the province in 1937. Expenses that year amounted to $17,000, the Premier said, and last year totalled $206,000. Outlining progress made in rural electrification, the Premier said the Act was "more general now" in that it did not require as many consumers per mile for power service. The overwhelming bulk of rural customers were those served by the Nova Scotia Power Commission, he said. The province was losing nearly $1 a month to every customer, however. This was because of sparsely populated

sections, requiring the provincial treasury to grant a subsidy. On the other hand, the Premier said, approximately 100,000 Nova Scotians were now enjoying an electric supply.

B.C. Conversion

Plans for the conversion from 25 cycles to 60 cycles supply of the Comox Valley power district communities, including Courtenay, Cumberland, Comox, Royston, Merville and adjacent areas, involving expenditure of approximately $680,000, have been announced by the British Columbia Power Commission.

Engineering Investigation

The Government of India has appointed a seven-man working party to investigate the condition of heavy engineering industries in the country. The party, consisting of three representatives of the Government, two of the industry and two of labour, will inquire into the means of increasing production, improving quality and connected problems.

Orders for Roxburgh Gorge

Through its agents, the National Electrical and Engineering Co., the British Thomson-Houston Co., Ltd., has been successful in obtaining the contract to supply the four 40 MW generators for the first stage of the Roxburgh Gorge power station, in the South Island, N.Z. The contract is valued at between £600,000 and £700,000. The sets will generate at 11 kV, each being driven at 136·5 r.p.m. by 60,000 h.p. water-turbine. The Dominion Engineering Co., of Canada, secured the contract for the four water turbines, parts of which are to be manufactured in New Zealand. Tenders were received from firms in eight countries, including Japan. Ultimate capacity of the station is 320 MW. Target date for completion is 1956.

A Mishap

While unloading a 24-ton synchronous condenser for installation at the Maungatapere substation of the N.Z. State Hydro-Electric Department, the crane, lifting capacity 40 tons, broke, dropping the condenser to the ground. Fortunately it fell into a position half in and half out of the bed which had been prepared for it, and was not badly damaged.

Coal Supplies

Irregularity of coal supplies to power stations in the Union was due to sheer lack of efficiency, Mr. E. L. Damant, of the Electricity Supply Commission of South Africa, told the Convention of the Association of Municipal Electrical Undertakings in Pietermaritzburg last month. The Convention appointed a deputation to see the Minister of Economic Development, and place before him a report on the position regarding coal supplies. A telegram was also sent to the Minister expressing the Convention's alarm at the increased freight rates on the transport of coal for power stations. Mr. Damant told the Convention that he had suffered the "indignity" of having to shut down one of the Commission's power stations because there was no coal. Mr. H. A. Eastman, of Cape Town, also added that the position was intolerable. Assurances had been given on a number of occasions that coal supplies were in hand. Yet recently the Cape Town power station was down to one and a half days' supply. Mr. D. A. Bradley joined in to point out that some two weeks ago at Port Elizabeth they scratched the yard to get sufficient coal to tide the station over the week-end.

Control at Salisbury

In order to save electricity, generating costs, plant and equipment and to avoid cutting off consumers' supplies over peak periods, the Salisbury Electricity Department, Southern Rhodesia, intends shortly to install a Ripplay relay control system in city homes to control the supply of electricity to water heaters and street lighting. If householders give permission to install the relay, the tariff of $\frac{1}{4}$d., normally applicable to water heaters, will be maintained, but should permission be refused, units will be charged at $\frac{1}{2}$d.

Plant for Singapore

Further contracts have now been placed for extensions to the new Pasir Panjang power station, Singapore, on which work is actively progressing. The Metropolitan-Vickers Electrical Co. is to supply a second 25 MW turbo-alternator, and Babcock & Wilcox will supply two more boilers, and various pipework. Orders have also been placed for other plant such as circulating water pumps and cranes, for the new station, and contracts are about to be let for a number of other items, including switchgear and oil-storage tanks. The consulting engineers are Preece, Cardew & Rider. Particulars of the new station, being erected for the Singapore Municipality, were published in our March 24, 1949 issue, page 401.

Philippine Power Scheme

A contract for the supply of all materials, machinery and equipment for a 25,000 kW hydro-electric power station at Maria Christina Falls, Mindanao, and of a fertiliser factory at Ilogan, Lanas, has been awarded to an Italian firm. The Philippine cabinet approved the award after the Philippine National Power Board had recommended acceptance of the proposal made by the General Industrial Corporation and the Compania Generale Impianti.

Malta's New Station

Answering questions in the House recently, the Prime Minister of Malta, Dr. Boffa, said the two consulting engineers who were advising the Government on the new power station had already made on-the-spot investigations. A preliminary layout of the proposed station, to be built beneath Jesuit's Hill, Marsa, had been prepared, but was still subject to revision.

PERSONALITIES

IN THE INDUSTRY

At present with the Commercial Section of the Central Authority of the B.E.A., **Mr. Ian F. Young,** A.M.I.E.E., is shortly leaving to take up his new appointment as engineer and manager of the States of Guernsey Electricity Department, in succession to **Maj. F. Barritt Hills,** D.S.O., who will retire in September next. Educated at Haileybury and Faraday House, Mr. Young spent his early training with Peter Brotherhood Ltd. Subsequently he served on the engineering staff of the West Gloucestershire Power Co., before going to the Metropolitan Electric Supply Co., and later to the London and Home Counties J.E.A. For a number of years prior to vesting day he was district manager to the Cornwall Electric Power Co., Ltd.

Mr. Ian F. Young

The new president of the Illuminating Engineering Society—to take office in October next—is **Mr. L. J. Davies,** M.A., B.SC., director of Research and Education, British Thomson-Houston Co., Ltd. The vice-presidents will be **Mr. C. R. Bicknell,** M.C., B.SC.(Eng.), of Siemens Electric Lamps and Supplies Ltd.; **Mr. J. G. Holmes,** A.R.C.S., B.SC., D.I.C., F.INST.P., of Holophane Ltd.; and **Mr. W. R. Stevens,** B.SC., M.I.E.E., F.I.E.S., of the Research Laboratories of the General Electric Co., Ltd. Mr. Davies joined the B.T.H. Research Laboratory on its formation in 1924, under its first chief—Mr. R. C. Clinker—working first on radio valves. He became head of the Vacuum Physics Section, and was later appointed lamp research engineer; head of the Research Laboratory in 1945; and was elected to the board of the company in 1946. He has been closely concerned for many years with the development of the discharge lamp, and especially the application of fluorescent lamps to road lighting. Mr. Bicknell commenced his career with Siemens Brothers and Co., gaining extensive experience in cable laying. He transferred to Siemens Electric Lamps and Supplies Ltd in 1931, and has since concentrated on lamps and lighting matters, and lectured extensively. He was a vice-president of the I.E.S. in 1949-50. Mr. Holmes is in charge of the laboratories of Holophane. He has acquired special knowledge of the manufacture of glass, and is regarded as one of the leading scientists in the lighting industry. Mr. Stevens, also a vice-president for the second year, joined the G.E.C. Research Laboratory in 1932, and has since served on many Government and B.S.I. committees and contributed various papers to learned societies on a wide range of lighting subjects. He is at present preparing a book on the principles of lighting.

Following Mr. F. William's appointment as superintendent engineer, Studios, B.B.C., **Mr. J. H. D. Ridley** has become head of the Engineering Secretariat, a department that deals mainly with the control of expenditure within the Engineering Division. Mr. Ridley has been engaged on radio work since the earliest days of broadcasting. Joining the B.B.C. in 1938, he became assistant head of the Engineering Secretariat in 1945.

A recent arrival in this country from Australia is **Mr. W. Riley,** sales superintendent of the Sydney County Council's electricity undertaking. He is over here to act as an adviser to manufacturers wanting information concerning the power supply position for industry and commerce in the Sydney metropolitan areas. The County Council has an extensive power expansion scheme under way with new generating plant now being installed at Pyrmont "B" and Bunnerong "B," while contracts for plant for the Lugarno station will soon be placed. Mr. Riley, who will remain here about four months is available through the office of **Mr. J. F. Magee,** the C.C.'s engineer representative in London, at 32 Victoria Street, S.W.1.

Mr. L. J. Davies

Mr. C. R. Bicknell

Mr. J. G. Holmes

Mr. W. R. Stevens

The Council of the Illuminating Engineering Society has decided to confer honorary membership upon **Dr. Ward Harrison** in acknowledgment of his valuable contribution to the advancement of the art and science of lighting. Dr. Harrison has for many years taken a leading part in the activities of the American Illuminating Engineering Society, of which he is a past-president and a Fellow. He served for a long time with the General Electric Co. of America, recently retiring from that organisation after having been Director of Engineering for the Lamp Department at Nela Park since 1930. It will be recalled that Dr. Harrison presented an address to the I.E.S. during the summer meeting at Harrogate in 1948.

The Aluminium Wire and Cable Co., Ltd. announce that **Mr. W. J. Nicholls,** M.Inst.C.E., A.M.I.E.E. joins their staff as from today, June 1, as assistant to the chief electrical engineer. He joins the company from the headquarters of the British Electricity Authority where he held the position of overhead lines design specialist. In his early years Mr. Nicholls served for five years with the Foundation Co. under Mr. J. L. Eve before joining the staff of Kennedy and Donkin. He was engaged in the whole of the grid construction in S.W. England and South Wales and can claim a unique experience of h.v. transmission in this country both on the established 132 kV network and in the initiation of the 275 kV system. In 1936, he became assistant to Mr. J. A. Lee, construction engineer of the C.E.B.

Mr. W. J. Nicholls

Following 30 years' service with Venner Time Switches Ltd., **Mr. R. G. W. Andrews** has now been appointed production manager to the firm. He took up an apprenticeship with Venner's in 1920 and, after its completion, worked through each department in turn, being, successively, chargehand, foreman and technical advisor to the production office. Later appointments included that of assembly superintendent and works superintendent, the last of which he has held since 1943. Venner's have also recently appointed **Mr. W. J. Ryan** as deputy production manager and **Mr. R. A. Abbott** as personnel manager. The former served previously with Thorn Electrical Industries Ltd., the Rootes Group and Wilmot-Breedon's.

Mr. R. G. W. Andrews

Mr. H. C. White

Mr. R. P. Sayers

In succession to **Mr. A. G. van Welie,** who is now managing director of the Stella Lamp Co. Ltd., **Mr. H. C. White** has been appointed commercial manager of the Light Group of Philips Electrical Ltd. with **Mr. R. P. Sayers,** F.I.E.S., as assistant commercial manager. A Yorkshireman, Mr. White joined Philips as a lighting representative in Leeds some twenty years ago, subsequently having charge of the company's special lamp department at head office. Subsequently he was manager of the Manchester Branch for ten years, during which time he became well known in the lamp and lighting industry in Lancashire. Mr. Sayers, the new assistant commercial manager, was a Holophane lighting sales engineer until 1934, when he joined Philips to develop the applications and sales of discharge lamps and lighting. Later he was manager of the company's Lighting Department, and sales of fluorescent, mercury and sodium lamps and lighting equipment.

Publicity manager of the Brush Electrical Engineering Co., Ltd., **Mr. Lewis Hart,** has been elected to the Council of the Incorporated Society of Advertisement Consultants. He has been a member of the society since 1935 and has now been granted a Fellowship. He is also a member of the Publicity Committee of B.E.A.M.A.

At present technical officer at the London headquarters of the Electrical Development Association, **Mr. J. A. Prowse** has been nominated as domestic and commercial development engineer, under the sub-area consumers' engineer in No. 4 sub-area of the North Western Electricity Board.

Formerly sales manager to H. J. Baldwin and Co., Ltd., **Mr. W. Newman** has now been appointed to a similar position with the Hepworth Iron Co., Ltd., who also make clayware conduits, in addition to pipes and similar goods.

Mr. W. Newman

Sir Ernest T. Fisk, deputy chairman and managing director of Electric and Musical Industries Ltd., sailed for America last week-end.

At last week's convention of the Electrical Contractors' Association, **Mr. P. G. Wallis,** Associate I.E.E., was elected president of the Association for the ensuing year. He is chairman of the Maidstone firm of G. E. Wallis and Sons (Electrical) Ltd. Mr. Wallis was elected to the Council of the E.C.A. in 1939, being vice-chairman since 1948. He has been honorary secretary of the Maidstone branch since 1934, and has also served as chairman of the East Kent and Maidstone branches. The vice-presidents of the Association are **Mr. A. F. Plummer,** of Shoolbred Electrical Co., Ltd.; **Mr. W. T. Trace,** of W. H. Trace and Son Ltd.; and **Mr. S. N. Watkins,** of the Birmingham firm of that name.

Mr. P. G. Wallis

At the annual meeting of the Electric Vehicle Association, **Sir John M. Kennedy,** O.B.E., M.A., M.Inst.C.E., Hon.M.I.E.E., was re-elected president, with **Mr. Peter Rochs,** general sales manager of Austin Crompton Parkinson Electric Vehicles, Ltd., as chairman for the third successive year. **Mr. R. Birt,** B.Sc.(Eng.), M.I.E.E., A.M.Inst.C.E., A.M.I.Mech.E., F.C.I.S., sub-area liaison officer, Southern Electricity Board, was re-elected vice-chairman.

His numerous friends throughout the industry will be interested to hear that **Mr. C. Pinkham,** manager of the publicity organisation of the General Electric Co., Ltd., is retiring at the end of this month, after 37 years' service with the company. Educated at the Leys School and Caius College, Cambridge, where he took his M.A. degree, he gained his Blue for rugger, soccer and lacrosse, and played soccer for England *v* France. He joined the G.E.C. in October, 1913, and returning from war service in 1920, was appointed manager of the Stock Rooms. In 1924, he was transferred to the Order Department as manager, and in 1927 became manager of the publicity organisation, in which capacity he has been responsible for the entire range of G.E.C. publicity. He has also been a member of the Council of the Advertising Association for 14 years. Charles, as he is affectionately known by his friends, has been a familiar and welcome figure at electrical gatherings, and his absence will be sadly missed. We wish him a long and happy retirement and the good health to enjoy it.

Mr. C. Pinkham

Simon-Carves Ltd. announce the appointment of **Mr. T. Moore,** M.Inst.F., to their Power Plant Department as assistant sales manager for the northern area of the British Isles. He was formerly engineer-in-charge of the Power Station Department of Davidson and Co., Ltd.

OBITUARY

It is with regret that we record the death on May 24 of **Mr. F. G. Nesbitt,** London director of Simplex Electric Co., Ltd., who was the first chairman of the B.E.A.M.A. Domestic Electric Cooker Section, chairman of the Domestic Electric Appliances Section, and of the Electric Water Heater Manufacturers Association. Although of recent years he has been associated with all Simplex products, it may justly be said that his whole career had been bound up with the electric cooking and heating industry, in whose development he played a major part. Educated at St. Bede's, Eastbourne, and George Watson's College and Heriot-Watt College, Edinburgh, he served for a time with J. Greig and Sons in the latter city, latterly as sales engineer. After war service he was manager of the electric cooking and heating department of the Carron Co. in London from 1920 until 1922, when he joined the old Credenda Conduits Co. (which was subsequently merged in the Simplex Electric Co.). He successively served as manager of the cooking and heating department, sales manager and, since 1932, joint sales manager. He was appointed a director in 1937.

Mr. F. G. Nesbitt

Mr. C. C. W. Stoodley, whose death we briefly noted last week, had been closely associated with the domestic appliances of the Hotpoint group companies for many years. On his appointment this year as general works manager to the Hotpoint Electric Appliance Co., Ltd., he took under his direct control the Peterborough factory of the Hotpoint Co., the Coldrator factory, Llandudno Junction, of the International Refrigerator Co., the Birmingham factory of Premier Electric Heaters Ltd., and the manufacture of those companies' products. He had not been recently associated with the Leicester branch of the B.T.H. Co. as we stated last week.

Mr. C. C. W. Stoodley

We note the death in Lisbon on May 13 of **Mr. R. W. Fraser,** M.I.E.E., aged 80.

The I.E.E. Annual Report

Year of Continued Growth

A YEAR of continued growth in membership and influence is reviewed in the 1949/50 Annual Report of the I.E.E. Council, which was presented to the A.G.M. held last Thursday at Savoy Place; 2,558 elections to Institution membership took place during the year, and at the beginning of April there were 16,648 corporate members and 18,900 non-corporate members on the register, showing increases in the twelve months of 4% and 3% respectively.

In all, just over 500 meetings were held during the year, of which 80 were London meetings, and 159 Students' Section meetings. The London meetings included nine ordinary meetings, which attracted an average attendance of 255 members and visitors, and 44 meetings of the specialised sections. Details of these are given in the table.

The outstanding event of the year for the Measurements section was the Symposium of Papers on Ferromagnetic Materials, which comprised 21 papers discussed at four sessions, and which attracted a total attendance of 560. Another notable series of papers was that presented at the Convention on Electric Railway Traction, which was organised following a recommendation of the Traction Technical Committee. Some 30 papers were presented during the seven sessions held, and a large number of Commonwealth and European engineers were amongst the visitors. Finally, there was the special meeting to commemorate the centenary of Oliver Heaviside's birth, at which tributes were paid by many eminent engineers. As a more permanent memorial to the great scientist, a Heaviside Premium, value £10, has been founded, for annual award for the best paper of a detailed mathematical nature accepted by the Institution.

Local centres and sub-centres continued very active, and during the year the North-Eastern, North-Western and the Scottish sections all attained 50 years of existence. Their jubilees were duly celebrated with appropriate ceremonies.

Technical Work

A wide range of technical investigations are undertaken by committees of the Institution. The Research Committee, for instance, has included in its work consideration of a Royal Society proposal to adopt the Joule (10^7 ergs) as the fundamental unit of heat, and in a wider sphere has been responsible for advising the Council on the two I.E.E. appointments which have to be made to the Council of the E.R.A. Further work of wide importance is being undertaken by the various Codes of Practice committees, which are dealing with a wide range of subjects.

ATTENDANCE AT SPECIALISED SECTION MEETINGS

	Membership at Mar. 31, 1950	Number of Meetings	Average Attendance
Measurements Section	1,853	13	102
Radio Section ...	4,518	15	112
Supply Section ...	3,096	8	149
Utilisation Section	3,213	8	87

Close connection with Government organisations is maintained on many subjects, an example being radio interference. The Wireless Telegraphy Act, 1949, provides for the setting up of an Advisory Committee on this subject, the members to be appointed from a panel nominated by the President with the approval of the Council. A committee on Regulations for the Electrical Equipment of Aircraft likewise co-operates with the Air Registration Board, and has recently considered amendments to the electrical section of the "British Civil Airworthiness Requirements."

One of the activities now being undertaken in conjunction with other bodies is the preparation of recommendations for the constitution of a proposed National Inspection Council for Electrical Installation Contractors. The B.E.A. has convened an Organising Committee on which the Institution is represented by one member.

Education

Much of the energy of the Institution's Education and Training Committee has been applied to consideration of the establishment of a Royal Institute (or Society) of Technology. The proposals of the National Advisory Council on Education for Industry and Commerce in this respect have been thought capable of improvement, and the three senior engineering institutions have jointly submitted alternative proposals. The committee organised during the year a Conference on Advanced Studies in

Electrical Engineering which attracted an audience of 237, and resulted in a very valuable exchange of views.

Amongst the incidental activities of the Institution in the field of education it is interesting to note that the Advisory Service on Education and Training, originally set up to aid students returning from war service, has performed so important a function that it is to continue as a permanent feature of the Institution's organisation.

Finally, amongst the examination statistics, is one unpleasant note. Out of 15 candidates for election who were given permission by the Council to submit theses only two finally had their work accepted.

"WORKING WONDERS" AT ABERDEEN

H.E. Board's Exhibition

"WORKING WONDERS," the biggest electrical exhibition ever staged in the North, was held in the Music Hall, Aberdeen, last week. Organised by the N. Scotland H.-E. Board in co-operation with the leading manufacturers of electrical equipment, the display was opened on Tuesday by the Lady Provost.

Mr. Thomas Johnston, Chairman of the Board, at the opening ceremony said that the exhibition was designed to show the public of Aberdeen and neighbourhood the great advances that had been made in the electrical equipment field. Over one thousand separate electrical labour-saving devices on show meant a new era of cleanliness and comfort in the home; easier living, which would change the whole life of the country in the next 20-30 years.

Very shortly, there would be added to the electricity supply of Aberdeen and district great bulk supplies of electricity brought down via Beauly, Inverness-shire, from Glen Affric. Mr. Johnston said that in the island of Orkney—with only one consumer to every 28 in Aberdeen last year—the cash and hire-purchase turnover of electrical appliances bought through the Board was equal to those in Aberdeen. In the whole of the Board's network last year more than 18,000 consumers were connected to the mains.

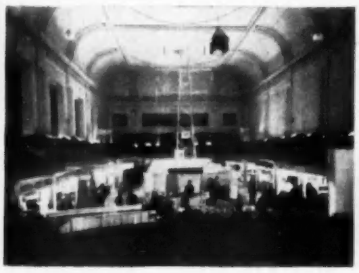
The stands, which included several stands from the Board's travelling exhibition, contained items specially suited to the requirements of the industrialist, hotel, boarding house and restaurant proprietor, the housewife, and even the schoolboy and schoolgirl.

A 45-ft. transmission tower, symbolic of the transmission of power from the glens to Aberdeen, power which soon will be flowing into the city, was the centre of a display of working models of a complete hydro-electric scheme, model turbines, model gas turbines, a miniature of the experimental windmill which is being erected in the Orkney Islands, and a model showing power supplies in a factory.

Electronic devices used in timing processes, the measurement of speeds and currents, were among other industrial exhibits. Visitors themselves operated machinery by breaking a beam of light, while another electrical device checked watches and located faults.

Hotel and boarding-house proprietors were shown how electricity serves the tourist industry. Kitchen equipment included electric mincers, peelers, dishwashers, mixers, and other modern appliances, while of special interest were the commercial baking demonstrations and catering talks given by Mr. Angus Mackenzie, of the Royal Technical College, Glasgow.

Below: A general view of the exhibition showing the 45 ft transmission tower. Left: B.I.C.C. exhibit. Right: Crompton Parkinson's stand

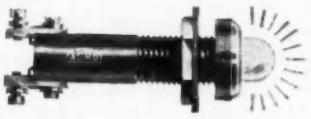


The BUYER'S *Column*

Red for Safety

CONTRARY to established opinion, a red light need not always indicate danger, in fact, in most cases where "Acru" neon indicator lamps are fitted the red glow of these lamps is a safety measure.

These miniature lamps can be used directly on



This is the "Acru" neon indicator with 180° visibility of the lamp

supply mains up to 440 V. There is therefore a vast field of application for them. Pilot and control lamps are being fitted to electrical apparatus and appliances in increasing quantities and here the neon indicator comes into its own. The most apparent advantage is its strength and rigidity in comparison with the normal indicator lamp with fine filament wire. Current consumption is negligible (below 1 mA) and its life averages 25,000 hours. The "Acru" lamp fittings can be fitted in a hole of $\frac{1}{2}$ in. diameter and are varied to permit either 100°, 120° or 180° visibility. In one model the dome incorporates a disc showing numerals, letters, or an arrow; a second model is fitted with a transparent plastic dome in red, amber-yellow and clear "Perspex." Prices for standard voltages 60 V a.c.-440 V ranges between 7s. 4d. to 7s. 10d.; models for minimum voltage 50 V a.c. being supplied at an extra charge of 20%. Further details from the manufacturers, ACRU ELECTRIC TOOL MANUFACTURING CO., LTD., 123 Hyde Road, Ardwick, Manchester 12.

Fittings for the Seaside

FLUORESCENT fittings which welcome a breath of sea air are those constructed by the COMMERCIAL ELECTRIC CO., LTD., of 110 Sackville Street, Manchester. These heavy quality fittings have their main control gear channels made from $\frac{1}{8}$ in. aluminium of 99% purity. The metal is corrosion-proofed before stove-enamelling so it is no wonder that large numbers of these fittings are taking a one-way trip to Britain's seaside resorts. Their robust build and long life in comparison with the normal steel fittings are factors which have found favour with illuminating engineers.

Even heating to within 0·1° C.

AN interesting method of heating for laboratory work has been introduced by ELECTRICALS LTD., 1 Broad St. Buildings, London E.C.2.

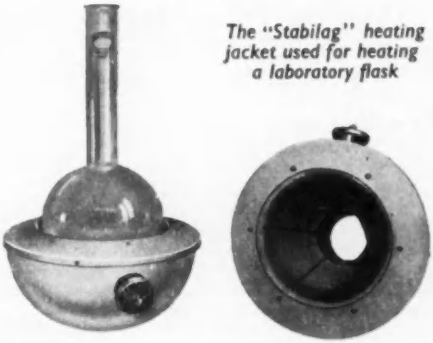
It is the "Stabilag" system of jacketing. Briefly, this comprises a woven fibre glass cloth in which is stitched a resistance wire. The pitch of this wire is so close that there is virtually no gradient between each turn. The element lies between two further layers of glass cloth, and an aluminium foil reflector is fitted to the underside of the inner layer to give rapid heat dissipation.

Each jacket is "tailored" to ensure a snug fit for its particular purpose and protected by an aluminium outer cover.

The particular advantage of this system of heating is the absence of awkward ancilliary gear, and its ability to provide absolute uniformity of heating avoiding "bumping." It is suitable for single and three-phase a.c. and for d.c.

Several types of control gear are supplied according to the degree of accuracy required, but for thermostatic control the "Tem-Con" sensitive head is built into the jacket. This unit, built by

The "Stabilag" heating jacket used for heating a laboratory flask



P.A.M. Ltd., will control any load within a tolerance of plus or minus 0·1° C. It comprises the sensitive head coupled to an amplifier and relay unit.

Whilst intended primarily for the laboratory, the Stabilag flexible heating jacket has a variety of industrial uses, and proves very suitable for use where a flexible heating surface is required, or in the heating of highly inflammable liquids.

Welding

REPRINTED as a separate booklet the "Welding Research" article, "Recommended Practice for Spot Welding of Low Carbon Mild Steel Sheet" is now available from the BRITISH WELDING RESEARCH ASSOCIATION, 29 Park Crescent, London, W.1, price 1s. 6d. As its title suggests, it is the interim report of the F.R.6 Committee recently formed to consider the preparation of a Code of Practice for Spot Welding of Mild Steel.

TRADE PUBLICATIONS

HAIR DRYERS. The all-insulated hair dryer recently produced by The General Electric Co., Ltd., Magnet House, Kingsway, W.C.2, is the subject of pamphlet H.A. 1104, issued by the company.

A.C. MOTORS. An abridged list of Brook a.c. motors, switchgear and accessories available from stock is now available from Brook Motors, Ltd., Empress Works, Huddersfield.

LAMPS AND LIGHTING. On the front cover of a recent Philips Electrical Ltd. publication is the question: "What is Velvet Light." The reader will find in answer an interesting description of the new "Argenta" lamp produced by the company.

BATTERY CHARGERS. Publication No. R228, issued by the Hackbridge and Hewittic Electric Co., Ltd., of Hersham, Walton-on-Thames, Surrey, gives details of Hewittic battery chargers.

CONDUIT FITTINGS. From Rich and Pattison (B'ham) Ltd., 81 Jamaica Row, Birmingham 5, comes a copy of their latest conduit fittings price list.

MOTOR CONTROL GEAR. Their insert in the 1949/50 B,E.A.M.A. catalogue has now been reprinted in brochure form by Allen West and Co., Ltd., Brighton, England.

ELECTRONIC INSTRUMENTS. A synopsis of the many industrial and scientific electronic instruments made by Cinema-Television Ltd., Worsley Bridge Road, Lower Sydenham, S.E.26, has been issued by the company.

SOLUBLE CUTTING OILS. The use of Supramor Galactol E.P. when machining nickel chrome and other tough st·els is described in a leaflet issued by Manchester Oil (Refinery Sales) Ltd., 170 Piccadilly, London, W 1.

DOMESTIC APPLIANCES. Catalogue No. 616 issued by Drake and Gorham Wholesale, Ltd., 77, Long Acre, W.C.2, illustrates the range of domestic appliances which are available from their stocks.

INDUSTRIAL LIGHTING. Fittings and accessories are listed and illustrated in a new edition of section F4 of the G.E.C. catalogue.

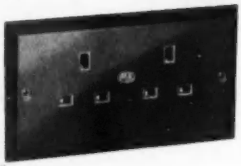
Ring Main Wiring

MK. Electric introduce extended range of 13 amp accessories

COMPLETION of a post-war programme of development has enabled MK Electric Ltd. to offer an extended and now really comprehensive range of accessories for the home market.

Included in this programme is a complete range of 13 amp flat-pin type plugs, switch-sockets, and other accessories, which have behind them a legacy of careful design and quality in manufacture, features which have been outstanding in all the company's products since they introduced the "Multi Kontact" (MK) spring grip socket just after the ending of the 1914-18 war.

A solution to the fusing of permanent "spur" circuits to inset fires, water heaters, etc., in the domestic ring main is presented by the introduction of the fused spur box. These neat boxes supplied in either flush or surface patterns are inserted in the ring main "spur" and provide the same facilities as does the fused plug or switch socket in the non-permanent circuits. These spur boxes are so designed as to provide for easy access to the cartridge fuse link for replacement.



Left, the flush type spur box; above a flush pattern 2-gang outlet, and above right, No. 2959 switch socket outlet.

In view of the correspondence in these columns relating to adaptors for 13 amp plugs and socket outlets it is interesting to note the introduction, by the company, of two-gang socket outlets which are designed in accordance with B.S. 1363: 1947 for 13 amp flat pin plugs, etc. These outlets provide the answer to the problem of adequate provision in the circuits for the usual "fireside" requirements, e.g., standard lamps, radio and television receivers, heaters, and the like.

List No. 2959, a new switch-socket-outlet surface type and the 2957 flush type are two new 13 amp accessories which will attract the attention of the wiring contractor with their neat design and positive action. They incorporate 13 amp switches of high electrical and mechanical efficiency. The flush type fits into a B.S. 1299 standard box.

These introductions tie up with the issue by MK of their first complete catalogue since before the war. The company wisely decided to delay publication until their programme of development had been completed. Copies are now available from the company at Wakefield, Street, N.18.

THE WEEK

INDUSTRY *in news* COMMERCE

I.E.S.—"Continued Expansion"

CONTINUED expansion of membership and activities of the Illuminating Engineering Society was reported by the president, Dr. J. N. Aldington, at the recent annual general meeting in Buxton. The president attributed the society's growth to "the diligence, perseverance and competence" of the headquarters staff, the Council, and officers of the various centre committees.

Attention was drawn to improvements made in the society's official journal, *Light and Lighting*. Referring to the register of Lighting Engineers, Dr. Aldington explained that every application was given the fullest and most careful consideration in order to maintain the standard of the register. It was hoped that the first Trotter-Paterson memorial lecture would be given during the coming session; consideration was also being given to the best use of the Dow legacy fund.

Manchester Electronics Exhibition

FIFTH annual Electronics Exhibition organised by N.W. branch of the Institution of Electronics will be held at the College of Technology, Manchester, on July 18, from 2.30 p.m. to 9 p.m. and on July 19 and 20 from 10 a.m. to 9 p.m.

Part of the Exhibition will be devoted to the interests of the amateur constructor, and demonstrations of television reception on receivers designed for home construction are to be given. Admission will be by ticket obtainable from Mr. A. Hickson, 205 Parrs Wood Road South, East Didsbury, Manchester 20.

Laboratory Technicians' Exam

GROWING recognition of the important part that trained technicians can play in furthering British industrial development has led the City and Guilds of London Institute to inaugurate an examination for laboratory technicians. The exam, adopted on the recommendation of the Institute's advisory committee on laboratory technicians, comes into operation during the 1950-51 session. It is intended only for those engaged in research work and not workers engaged in routine testing operations.

The scheme envisaged is a three-year part-time course requiring attendance at a recognised school for approximately 180 hours per year with the City and Guilds examination at the end of the third year. The suggested curriculum is Section 1, science and drawing; Section 2, general laboratory techniques and organisation, including laboratory workshop practice; Section 3, specialised laboratory techniques. So far, only the syllabus for the intermediate certificate examination has been prepared; the final certificate is still in course of preparation.

Power Station Contracts Placed

A CONTRACT worth £1,375,000 has just been placed with Sir Robert McAlpine and Sons (Newcastle-upon-Tyne) Ltd., for piling and foundations for buildings and circulating water culverts as well as for an accommodation bridge, roads and railways for the new North Tees "C" power station. The present North Tees "A" and "B" stations have an installed capacity of 110,000 kW. Capacity of the new "C" station will be 240 mW.

A contract valued at over £550,000 has also been placed with Sir Robert McAlpine and Sons (Midlands) Ltd. for main railway sidings and preliminary works, sewage disposal and reinforced concrete works for the new Drakelow power station, near Burton-on-Trent. This station when completed will also have a capacity of 240 mW.

Safety Valve Tests

SUCCESSFUL high pressure, high temperature capacity tests on their full lift safety valve and their Maxiflow design of safety valve have just been carried out by Dewrance and Co. Ltd. The tests were undertaken with the co-operation of Midlands division, B.E.A., associated offices of

The First Half-Century

There have been sad doings in Killarney. The charge brought by the Urban District Council against the Electric Light Company was that on twenty-eight occasions it made default in supplying some or all of the public and private lamps in the town. The financial relations of the litigants at the time were not satisfactory, the Council owed the Company £35 but had no funds wherewith to pay the same, possibly because the Company on its part owed poor rates to the amount of £66 19s., which it declined to pay pending an appeal. It appears that the interruptions to the light arose from the breakdown of an alternator, and a lack of reserve was attributed to the non-delivery of plant in time by the contractors. There was a good deal of irrelevant squabbling, but the magistrate took only ten minutes to impose a fine of five bob and five bob costs in each of the eight and twenty cases.—*From our issue of May* 31, 1900.

Snapped at Henley's arts and crafts exhibition —Miss M. Reeves with her Punch and Judy puppets. Inset: A prize-winning oil painting, "The Flemish Peasant"

the technical committee of the insurance companies, Merz and McLellan and Messrs. Babcock and Wilcox Ltd. Detailed results are to be published shortly.

Arts and Crafts at Henley's

ALTHOUGH now a hardy annual, Henley's arts and crafts exhibition—the eighth of which has just been held—never loses its attraction and always seems to provide something different. Last week's display was no exception, with 184 exhibits of very high quality. This year, to make the competitive side more interesting to the newcomer, previous winners voluntarily withdrew and the number of prizes in each class was based on the number of contestants.

Of special interest was a fine study in oils by R. E. Southenden of a Flemish peasant. Failing sight almost obliged the artist to give up his hobby, but perseverance has rewarded him with two prizes this year, a first and a highly commended. In the model making section a model ship, "A First Rate of 90 Guns," exemplified the patience of its constructor, B. N. Purdie, who won first prize. The handicrafts section, too, was distinguished not only by the large number of exhibits but by their neatness and careful execution.

T.V. Filmstrips in Colour

FOLLOWING the success of their series of film strips on "The Radio Valve," the technical publications department of Mullard Electronic Products Ltd. have recently introduced two new filmstrips describing the "mechanism" of television and the general features of television receiver circuits.

Produced in colour with the co-operation of the National Committee for Visual Aids in Education, the film strips are being distributed by "Tartan" Filmstrips, price £1, complete with summarised lecture notes. Detailed lecture notes are available from the Mullard company, either for use as a basis for more extended lessons, or for verbatim delivery before scientific or radio societies.

Jackson Roasting Oven

IN OUR issue of May 18 we published a picture of the Jackson No. 13 Electric Roasting Oven with the erroneous caption of "Hot Cupboard." This oven, which has recently been re-designed, is capable of cooking 150 to 200 lb. of meat at one filling and is fitted with a lagged centre shelf which enables either half of the oven to be used independently when smaller quantities of roasting are required. Each half of the oven is separately heated and controlled. This feature permits considerable economy and enables the bottom half to be used for roasting and the top half for ordinary baking.

Goods Freed

FROM today more articles have been added to the list of goods which may be freely imported from the usual list of "permitted countries," and certain amendments made to existing lists. Goods freed entirely include railway signalling plant, refrigeration machinery and refrigerators. Magnesium has been added to the list of metals free from import restrictions.

North Wales—More Discussion

REPRESENTATIVES of many of the local authorities concerned attended a meeting of the Merseyside and North Wales Electricity Consultative Council last week, at which Mr. A. R. Cooper, divisional controller, explained the main features of the proposed hydro-electric scheme for North Wales. They were invited to submit written questions, but a number of them could not refrain from interrupting while Mr. Cooper was answering. The Council carried, by 15 votes to 1, with 4 abstaining, a resolution expressing the view that the proposed schemes would be in the best interests of the people, and assist in counteracting the depopulation of the rural areas.

Attacking the "more aesthetic person," Mr. Cooper said some of these could see beauty in a corrugated iron shed if it was built by a shepherd. He urged critics of the scheme to take a look at some of the shanty towns along the coast.

During the discussion, Mrs. H. Harry, of Harlech, asked for the exclusion of the Snowdon project, as this would only produce 89 million units annually, but withdrew her amendment when assured that it was probable that two schemes, not the Snowdon one, would be proceeded with first, and the position then reviewed. Replying to another question, Mr. Cooper said it had not been decided whether the B.E.A. would introduce the Bill this autumn or next. Neither had it been settled whether the Bill should cover eight, four or two schemes, but in any event the eight schemes

would not be proceeded with simultaneously. Later, when Councillor H. Owen, Caernarvon C.C., asked what was the position of the Menai Straits scheme for generating electricity, Mr. Cooper replied that this tidal scheme had not been brought forward because they were not satisfied about the engineering aspects. Also, generation would not be continuous. Subsequently, Mr. J. Eccles, chairman of the Merseyside and North Wales Electricity Board, described the progress made with rural electrification, consumers being connected at the rate of 80 every working day; 16,000 had been connected in North Wales in the past two years.

Hoover's new mobile exhibition

Hoover Goes Mobile

HOOVER LTD. is to make an all-out drive for rural sales. This week a mobile exhibition, described as a new departure in electrical appliance presentation, begins an organised tour of the principal county and agricultural shows, halls and village institutes all over Britain.

A fully equipped demonstration theatre on wheels, the exhibition comprises two 22ft. caravan trailers towed by 2-ton Fordson vans. By ingenious planning the trailers have been arranged to form a complete exhibit when placed at a right angle. Country dwellers will see demonstrations of all Hoover products—carpets cleaned by the Hoover Cleaner, and the family wash performed by the washing machine. For the farmer seeking an economical motor for his machinery, fractional h.p. motors will be available. Nothing has been forgotten, there is even a continuous self-operating back projection film unit.

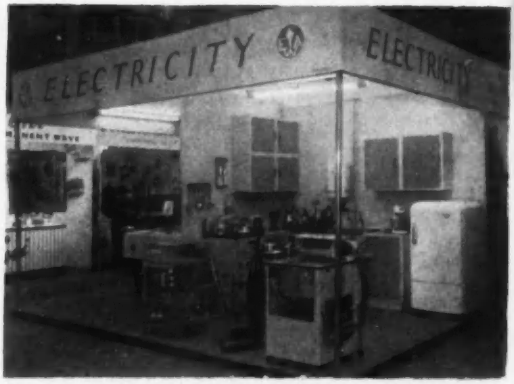
The exhibition depends on local sources for electricity and water only, an immersion heater providing hot water supply and heat for a drying cabinet. Besides a sales office, provision has also been made for a dressing room for the use of lady advisers. The demonstration room for washing machines has been fitted up to resemble an ideally planned kitchen, while a draped French window recess, suggesting a domestic atmosphere, has been incorporated in the electric cleaner demonstration room. Together the two vehicles occupy an area of 1,500 sq ft, the triangle being completed by ropes and posts. Reserves of display material are carried in the vans.

Alleged Fraudulent Conversion

AT BOW STREET COURT last Thursday, Mr. R. M. Channell was accused of fraudulently converting the sum of £553, received on behalf of Erinex Ltd., electrical domestic appliance manufacturers. The prosecution said the company had a capital of £50,000, of which Channell's wife held £30,000 in shares. In 1944 the defendant was appointed consulting engineer to the company at a salary of £12 a week. Under authority of the board of directors, the company's bankers transferred to Channell's private account £18,994 during 1946 and 1947, and subsequently that authority was cancelled, it was submitted; it being alleged that he adopted an extravagant mode of life. Erinex Ltd. was compulsorily wound up in October, 1949. The defendant was remanded until June 5, being granted bail with certain conditions.

B.E.A. to End Property Trust

THE British Electricity Authority has decided that the Bankside Investment Trust, a property company owning, *inter alia*, Alder House, Falcon House and Bankside House, E.C., with substations in the City formerly operated by the City of London Electric Lighting Co. Ltd., is extraneous to the Authority's functions under the 1947 Act. The B.E.A. therefore intend to dispose of the properties, put the company into liquidation, and repay the outstanding £800,000 of 5% Debenture Stock at 110%. The £200,000 of issued share capital is owned by the B.E.A.



Showing young women how electricity can aid housework. Appliances at E.D.A.'s stand in the Schoolgirls' Exhibition

Long Service Awards

CERTIFICATES recording long service to the Electricity Supply Industry are to be presented to a group of former employees of the North Western Division of the B.E.A. who have retired since the formation of the Authority in 1948. The presentations were made individually by Mr. C. T. S. Arnett, O.B.E., B.SC., M.I.E.E., M.Inst.F., divisional controller, last Thursday, after which the recipients were entertained to tea.

The recipients on this occasion were Messrs. J. Brookes, Ribble; W. N. Chadwick, Blackpool; J. Crabtree, Nelson; W. Dowden, Accrington; J. Hayhurst, Accrington; J. Hennessy, Blackburn; J. S. Jones, Bloom Street; C. H. Lewthwaite, Blackpool; J. Murray, Bury; J. Sellars, Stuart Street; R. Speight, Ribble; J. Thorburn, Blackpool; W. Thorp, Stuart Street; E. Topham, Ribble; W. H. Turner, Whitehaven; and F. Young, Stuart Street.

This will be the first of a series of presentations to similar groups of retired employees.

Railway Civil Engineering

AN EXHIBITION of Railway Civil Engineering was opened by Sir Eustace Missenden, chairman of the railway executive, at the Institution of Civil Engineers, Great George Street, Westminster, last week. It will be open to the public, admission free, on weekdays, until Saturday, June 3, from 10 a.m. to 6 p.m., and on Thursday, June 1, until 8 p.m.

Contemporary colour prints and working drawings, some of them a century old and signed by famous engineers, will show the earliest railways under or just after construction, many features of which can still be recognised today.

The up-to-date section illustrates by photographs, models, plans and apparatus the methods used by the railway engineer to cope economically with enormously increased wear and tear on earthworks, bridges and permanent way caused by much greater frequency of services and a much greater number of heavier locomotives, problems never envisaged by the early engineers.

Canada Purchases Capacitors

A LARGE consignment of power capacitors has just been shipped to Canada by British Insulated Callender's Cables Ltd. Intended for installation in the system of the Shawinigan Water and Power Company, Quebec Province. The complete order consists of a 15,000 kVAr bank of capacitors for operation at 11 kV made up of sixty 250 kVAr units.

Freight Handling

A PRODUCTIVITY team representing Britain's railways, docks and harbours, and long distance road haulage left Southampton in the *Mauretania* on Saturday to begin a study of American freight handling. Terms of reference of the team are:

"To examine and report on practices and methods in the use of mechanical appliances and of present terminal layout and design, for conveyance and storage of commodities, by American railroad, road transport, docks and shipping organisations, including both domestic and inter-transfer movements, with particular regard to efficiency and economy."

In New York the team will study mechanical handling facilities at the railway stations, docks and trucking terminals; at Boston a modern pier layout, and mechanical handling of fruit, fish and cold storage meats in the port and at Chicago, railway traffic and shipping on the Great Lakes.

Service Centre Wins Competition

PART of the floral dance celebrations in the "quaint old Cornish town" of Helston, local traders this year held a window display competition. First prize was awarded to S.Western Board's Helston service centre. Flowers are naturally the keynote of the Flora Day festivities and the centre's window was enlivened with cinerarias, lilies-of-the-valley, and bluebells, the colours effectively setting off the white electrical appliances.

Loaded with capacitors for Canada, lorries leave the B.I.C.C. factory at Helsby

Bright Ideas Win £300

AWARDS totalling £300 have recently been paid to three employees of Joseph Lucas, Ltd., for efficiency-improving ideas submitted in the firm's Workers' Suggestion Scheme.

For an idea for an improvement in the winding of armatures, resulting in a decrease in the number of rejects, Mr. Harry Coley, first received £20 and then an additional special award of £100 for the best idea of the month. Mr. William Griffin was awarded £100 for a suggestion to lengthen the life of key cutters, and Mr. A. T. Argyle received £80 for designing a special tool to salvage lamp reflectors.

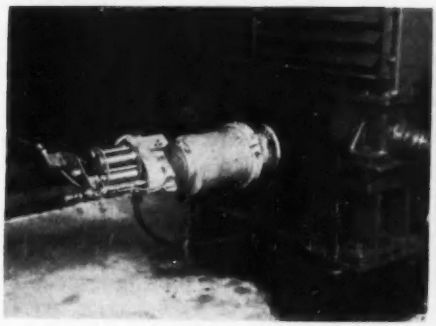
Presentation of the awards was made at the Shaftmoor Lane works by Mr. R. C. Leech, general factory manager of the Birmingham group of Lucas factories. Since the beginning of this year the firm has awarded £2,000 for workers' ideas which improve efficiency.

Automatic Cartridge Starting

THE CARTRIDGE method of starting diesel and petrol engines has been used for many years, and a further extension of this useful form of self starter is now announced by the Plessey Co. Ltd. This is specifically designed for use with stand-by diesel or petrol-driven plant and provides automatic starting in the event of a failure or a voltage drop in the outside supply mains. The starter is mounted in place of the hand starter bracket and has a capacity of five starts without reloading, a 24 V d.c. operated breech mechanism being fitted to obtain automatic indexing of the breech and firing of the cartridges.

Operation of the starter is controlled by sensitive relays, a reduction of more than 17% in voltage on the supply mains being sufficient to establish changeover conditions. In the event of a failure to start, a relay momentarily breaks the firing circuit, thereby resetting the breech control relay and firing a second cartridge. A return of voltage to within 6% of normal resets the control relay, but a thirty-second delay is introduced to prevent change back to normal conditions in the event of a momentary restoration of supply.

Original work on this system was carried out using a 38 h.p. diesel engine coupled to a 20 kVA 3-phase alternator, and owing to its success, consideration is being given to the conversion of diesel engines up to 200 h.p. (where crankshaft and engine design permit) to widen the commercial application of the system.



Close-up view of the Plessey cartridge starter fitted to a 20 kVA generating set.

NEWS IN BRIEF

Len Harvey presented prizes when Telcon social and dramatic club's amateur boxing section held their first inter-club tournament, with the Royal Ordnance Factory amateur boxing club.

Sunco Association football team topped Westminster league third division this season.

M.E.M. have issued the first post-war edition of their employees' handbook.

A 4,600-ton collier being built at Sunderland for B.E.A. is to be named after Lord Citrine.

Carlisle police were set a problem when a 63-ton section of a h.e. turbine on its way from Metro-Vick, Manchester, to Pitlochry, passed through the city. The load was 16 ft. 6 in. wide.

Willesden factory of B.T.H. is to hold its annual apprentices' parents' day on Saturday, July 1.

In the House of Commons last week, in reply to a question by Sir W. Wakefield, the Postmaster-General said there were 424 licences currently in force for operation exclusively on very high frequencies. These covered 3,507 stations.

Twenty-four Swedish engineers saw four Mirrlees diesel-driven generators, two installed in 1915 and two in 1919, when they recently visited Macclesfield power station. All four are still in operation.

B.T.H. marine radar equipment is to be installed in the *Velutura*, the first of the Anglo-Saxon Petroleum Company's new 26,000-ton tankers. The order is a result of tests carried out on another of the company's tankers during the last six months.

A telephone exchange installation at Chester, delayed by the war, has just been put into service. Standard Telephones and Cables Ltd. have built a 6,100-line automatic exchange at Chester and an 800-line automatic exchange at Christletow.

In our issue of May 18, referring to the Lisburn street lighting installation, we incorrectly said it was the largest fluorescent scheme yet undertaken in the British Isles. This is not so. The Rugby installation is larger.

Because Finsbury Technical College Old Students' Association is being wound up, the Hon. Treasurer, W. B. Thompson, of Elleray, Regent Road, Altrincham, Cheshire, is appealing for suggestions from past students as to the distribution of the funds.

Electric Supply News

Aberdeen

A proposal of the North of Scotland Hydro-Electric Board to service free of charge to the County Council, housing schemes where electricity was used for cooking purposes, was discussed at a recent meeting of the County Housing Committee. The county architect reported that for a Bankhead scheme, the Board had stated that if the supply were to be taken for lighting and small appliances only, the charge for laying the service would be £810. The Scottish Gas Board had also offered to waive their charge for laying mains in this case, offering to supply a gas cooker and 10-gallon washboiler at a total cost of £22. The comparative cost for an electric cooker and washboiler was £21 9s. 3d. After some debate it was considered that a compromise might be reached with the Hydro Electric Board, and a meeting is to be arranged to discuss the question.

Bonnybridge

Consent of the Minister of Fuel and Power has been received, for the extension of the Bonnybridge power station by the addition of a further 15 MW turbo-alternator. This will raise the installed capacity of the station to 80.940 MW.

Carmarthen Bay

Much of the heavy foundation work for the first section of the Carmarthen Bay power station has been completed. In No. 1 turbine room the surrounding walls of the basement have been constructed in reinforced concrete up to surface level, and the concrete foundations to support the two 52·5 MW turbo-alternators to be installed in the first section of the station are in an advanced state. The first set is due to go into commission about September, 1952, said Mr. T. H. Wood, chief generation engineer (construction) of the South Wales Division, recently. The second unit should be ready early in 1953 and a third set by 1954. On the seaward side a system of concrete culverts has been constructed to supply the 18,000,000 gallons of sea-water an hour required for steam condensing purposes. In the boiler house the foundations are now being placed to support five 240 k lb/hr boilers. The chimney foundations are supported on 250 piles and are now ready to be extended to boiler house roof level, from which height the chimney stack proper will rise to 300 feet above ground level.

Connah's Quay

The Minister of Fuel and Power has now granted formal consent to the establishment of a new station at Connah's Quay, Flint, the first section of which will comprise two 30 MW turbo-alternators, two 300 k lb/hr boilers and a cooling tower. The station is to have an ultimate capacity of 180 MW.

Hammersmith

A new contract for street lighting in the borough has been submitted to the Council. Under this the supply of electricity for all-night burning is calculated at the rate of 4s. per 100 W per q., plus ¾d. p.u. On that basis, the total cost during the present financial year is estimated at £11,233, as compared with the sum of £11,000 provided in the annual estimates. The total estimated charge for maintenance for the year is £11,490.

Malvern

The Ministry of Fuel and Power is to hold an enquiry on Wednesday next at Malvern Council House into a proposal of the Midlands Electricity Board to erect a 66 kV line across the Malvern Hills. The Board contends that the line is essential to provide additional supplies to Herefordshire.

North Wales

A scheme for the reinforcement of supply to North West Wales is to be undertaken by the Merseyside and North Wales Division. It involves the building of 48 miles of 132 kV double circuit line from Hawarden to Dolgarrog and Bangor, with transformers at each of those places.

Southern Board

An effort would be made to obtain electricity charges in the Southern Area reduced so that they would be comparable with what was paid in the rest of England, declared Ald. E. W. B. Gill, deputy chairman of the Area Consultative Council recently. Figures showed that the Southern Area paid more than 14% higher charge for domestic two-part tariffs than the average for the rest of the country. Southern consumers paid 1.32d. per unit against the national average 1.13d. The commercial two-part tariff was 5% higher, and the farm tariff 3%.

Thanet

Investigations are being carried out as to the possibility of siting a new generating station on a 100-acre site adjoining the Ramsgate-Sandwich Road, in the Richborough area.

LIGHTING SCHEMES

Alton.—The U.D.C. has approved the installation of a mercury vapour system of street lighting; a scheme is to be submitted to the M.o.T.

Bridlington.—The local Chamber of Trade is seeking to meet the T.C. to discuss an illuminations scheme for the autumn.

Blackpool.—The Electrical Services Committee has approved in principle a draft agreement between the Corporation and local members of the Electrical Contractors Association for the carrying out of the work of colour flood lighting of hotel and boarding house frontages on the Promenade between Squires Gate and Bispham.

Fort Augustus.—The council is to go into the possibility of electric street lighting.

Company Activities

Barton and Sons

Group trading profit for 1949 was £371,509 (*£325,684*), plus investment income £557 (*£4,707 and sale of investments £993*), making £372,066 (*£331,384*). Depreciation takes £49,625 (*£50,385*), emoluments of parent company's directors £18,086 (*£14,725*), remuneration of parent's auditors £375 (*£750*), pensions £4,335 (*£4,156*), capital increase expenses written off nil (*£75*), tax £181,136 (*£166,873*), leaving a net profit of £118,509 (*£94,420*). Written off cost of shares in subsidiaries £8,183 (*nil*), to general reserve £70,000 (*£61,368*), Preference dividend £13,891 (*£13,066*), final Ordinary 7%, making 10%, £22,275 (*£15,592*), leaving £33,494 (*£29,334*) carried forward.

W. N. Froy and Sons

Profit for 1949, after all charges including tax, was £39,538 (*£46,068*). U.K. tax £38,023 (*£54,844*). Dividend is 10% on increased capital (*15%*).

Harland Engineering Co.

Preliminary statement shows group profit for 1949 of £51,113 (*£48,105*). Dividend on old Ordinary is 7% (*same*), and a new Ordinary 1$\frac{1}{16}$%. To depreciation £22,535, taxation £33,765 (*£54,341*), and to plant replacement, etc. reserve, being tax benefit arising from initial allowances £14,875 (*nil*). To general reserve £10,000 (*same*), other reserves £10,500 (*£22,500*), dividends £14,805 (*£12,650*), carried forward, parent £28,531 (*£17,098*).

Hopkinsons Ltd.

Trading profit for the year ended January 31 last was £627,688 (*£568,289*), plus dividends £7,180 (*£8,432*), and profit on sale of investments £2,282 (*£1,096*), making £637,150 (*£577,817*). Depreciation takes £47,416 (*£42,825*), plus profit on sales and scrapping of assets £411, audit fee £448 (*£454*), taxation £281,715 (*£257,000*), leaving net profit of £277,855 (*£243,674*). With £253,344 (*£156,831*) brought in there is £531,199 (*£404,228*) available. To general reserve £100,000 (*£50,000*), contracts maintenance reserve £5,000 (*£3,000*), investment reserve £2,282 (*£1,096*), Preference dividend £13,475 (*same*), Ordinary dividend 22$\frac{1}{2}$% £43,313 (*same*), leaving £367,129 carried forward.

Mather & Platt

It is proposed to raise the issued capital to £2,445,490 by making a bonus issue of one new £1 Ordinary share for every two shares held.

Power Investment Corpn.

Net revenue for the year to March 31, after debenture interest, income tax, etc., was £16,774 (*£19,477*). To Preference dividend £14,751 (*same*), leaving £31,497 (*£29,474*) carried forward.

Power Securities Corporation

Group profits from contracts and other income for 1949 was £398,114 (*£366,004*) plus investment income £12,399 (*£12,637*), making £410,513 (*£378,641*). Remuneration of directors of the holding company £19,270 (*£16,268*), bank interest £3,894 (*£5,344*), written off trade investments £15,325 (*£6,204*), depreciation £100,147 (*£63,111*), profits tax £40,785 (*£43,306*), income tax £109,860 (*£112,079*), attributable to minority interests £5,590 (*£3,652*), leaving consolidated net profit of £69,807 (*£60,628*) for holding company and £45,835 (*£68,049*) retained by subsidiaries. Add tax over-provision or recoverable £15,184 (*£56,933*). To pension fund £5,650 (*same*), off good will nil (*£2,214*), general reserve £43,314, contracts reserve £55,000 (*£50,000*), Preference dividend 7% £19,250 (*same*), Ordinary dividend 6% £26,400 (*same*), leaving carried forward £66,868 (*£64,527*) by holding company and £46,817 (*£67,946*) by subsidiaries. During the year, the company acquired the whole of the share capital of Duncan Watson (Electrical Engineers) Ltd.

Pressed Steel Co.

Net profit for 1949, after all charges, including taxation, was £860,399 (*£553,538*). Taxation absorbs £1,095,480 (*£723,453*). There is a final Ordinary dividend of 10%, making 20% (30%). The preliminary statement shows a credit of £120,000 in respect of a contingency provision no longer required. To general reserve is allocated £120,000, the cost of the bonus capital issue being £21,723.

Vent-Axia Co.

For the year to March 31 last, profit, before tax, was £66,312 (*£70,040*), plus taxation over-provided in previous years £3,127 (*nil*). To tax £37,218 (*£39,287*), expenses of share marketing nil (*£2,407*), expenses of bonus issue £499 (*nil*) to general reserve £10,000 (*£11,678*), dividends £20,625 (*same*), leaving £8,217 (*£7,120*) carried forward.

Dividends Declared

Atlas Electric and General Trust.—Dividend of 3% (2$\frac{1}{2}$%).

T. Clarke and Co. Final dividend of 5%, making 10%. Net profit for 1949 was £15,707 (*£13,263*). To tax £8,600 (*£8,484*), written off quotation expenses £1,509 (*nil*), leaving £448 (*£1,032*) carried forward.

Dictograph Telephones. Interim dividend of 10% (*same*) payable on June 17.

Lisbon Electric Tramways. Dividend of 2$\frac{1}{2}$% tax free, making 5% (*both same*).

Plessey Co. Interim Ordinary dividend of 10% (*same*).

Siemens Brothers and Co. Ordinary dividend of 7$\frac{1}{2}$% (*same*). Group profit after all charges including tax, £514,759 (*£450,423*).

B. S. and W. Whiteley. Dividend of 80% (*same*) on larger capital.

Commercial Information

CONTRACTS OPEN

HOME

June 2.—Belfast. New electrical installation in auxiliary maternity unit at Belfast City Hospital for South Belfast Hospital Management Committee. F. W. Parkinson and Partners, 93 Ann Street, Belfast. Deposit £2 2s.

June 5.—Acton T.C. Supply and installation of bracket type electric street lighting units in Sunbeam and Atlas Roads. Borough Engineer, Town Hall, Acton, W.3.

June 5.—Hazel Grove and Bramhall U.D.C. Supply and installation of steel columns, lanterns and accessories for provision of improved lighting to Group A standard on one mile of trunk road, A.6 (London Road). Engineer and Surveyor, The Council House, Hazel Grove, Cheshire. Deposit £2 2s. (See our May 25 issue.)

June 5.—Inverness. Electrical work for two blocks of cottages at Leachkin Road for Inverness Hospitals board of management. Alexander Ross and Son, Architects, 28 Queensgate, Inverness.

June 5.—Skelmersdale U.D.C. Installation of electricity to 22 council houses, School Lane. J. L. Mather, architect to the Council. Deposit £1 1s.

June 5.—Worsley T.C. Year's supply of metal filament lamps and 140 W sodium lamps. L. T. Broome, Engineer and Surveyor, Town Hall, Walkden.

June 6.—Manchester E.C. Electrical engineering equipment for Municipal College of Technology, Chairman, College of Technology sub-committee, Education Offices, Deansgate, Manchester 3. (See our May 11 issue.)

June 7.—Belfast T.C. Cafe kitchen electrical equipment. Parks and Cemeteries Department, Botanic Gardens Park, Belfast.

June 7.—Warrington. Rewiring electrical installation at Borough Treasurer's Office, Bank House, Sankey Street. Borough Surveyor, Town Hall.

June 7.—Winsford U.D.C. Installation of electric wiring in 150 pre-war houses. P. Heaton, Surveyor and Engineer, Council Offices, Over Hall, Winsford.

June 8.—Camberwell T.C. Installation of cremation furnaces at Honor Oak crematorium. Borough Engineer and Surveyor, John Clapp, Town Hall, Camberwell, S.E.5. (See our May 11 issue.)

June 9.—East Ham T.C. Supply and erection of standards, electrical lamps, lanterns and electrical equipment on East Ham-Barking By-Pass road. F. C. Ball, Borough Engineer and Surveyor, Town Hall, East Ham, E.6. Deposit £2 2s.

June 9.—Manchester T.C. Rewiring of electrical installation at the Margaret Barclay Residential School for Crippled Children, Mobberley Hall, Mobberley, Ches. City Architect, Town Hall. Deposit £1 1s.

June 9.—Manchester T.C. Electrical installations required in connection with the erection of 7 shops, 7 maisonettes, and 7 garages at each of the following sites, for (*a*) Baguley Hall West Sub-centre, Bowland Road; (*b*) Newall Green South Sub-centre, Greenbrow Road, Wythenshawe. City Architect, Town Hall. Deposit £1 1s.

June 9.—Rineanna. Supply and erection at Shannon Airport of one 100 kVA electric generating plant, for Department of Industry and Commerce. J. V. Tierney, Consulting Engineer, 15-16 Duke Street, Dublin. Deposit £1.

June 9.—Sheffield T.C. Electrical installation in 100 aged persons' flats on Manor Park estate; 16 aged person's flats on Richmond estate; 44 terrace houses on Manor Park estate; and 41 terrace houses on Littledale estate. Town Clerk, Town Hall, Sheffield 1. Deposit £1.

June 9.—Windsor R.D.C. Electrical work for improvement to 30 houses in the parish of Sunningdale. Building Surveyor, Council Offices, Bowden Road, Sunninghill.

June 10.—Newton Abbot U.D.C. Installation of electrical wiring and fittings for 60 houses on the Buckland housing estate. Surveyor: C. Lunn, 18 Devon Square, Newton Abbot.

June 10.—Dornoch T.C. Electrical work for 18 houses at Bishopfield site. Burgh Surveyor, Dornoch.

June 12.—Bury T.C. Electrical installations in Elton nursery school. Borough Engineer, Town Hall, Bury. Deposit £1 1s.

June 12.—Bury T.C. Electrical installations at Market Hall, Borough Engineer, Town Hall, Bury. Deposit £2 2s.

June 12.—New Windsor. Electrical installation to 30 houses to be erected on Imperial Road site. Borough Engineer, Kipling Memorial Building, Windsor, Deposit £1 1s. (See our May 11 issue.)

June 12.—Leslie T.C. Electrical work for 24 houses at Prinlaws site, Leslie. A. D. Haxton and Watson, Architects, Leven.

June 13.—Dublin T.C. 100 cast-iron electric lamp standards for street lighting. Deputy City Engineer, 28 Castle Street, Dublin.

June 13.—Leeds T.C. Supply of electric lamps. General Manager, 1 Swinegate, Leeds 1.

June 13.—Newbiggin-by-the-Sea U.D.C. Electrician's work for 26 houses on Spital Farm housing site. Engineer and Surveyor, Council Offices, Front Street, Newbiggin, Northumberland. Deposit £2 2s.

June 14.—Dublin. Electrical installation at Garda depot, Phoenix Park for Public Works Commissioners. Office of Public Works, Dublin. Deposit £1.

June 14.—Wiltshire C.C. Electrical engineering tools for Chippenham section of N.W. Wilts college of further education. P. A. Selborne Stringer, Clerk, County Hall, Trowbridge.

June 19.—Glossop T.C. Electric lighting, special stage lighting, and ventilation for Victoria Hall. Geo. Faulds, Borough Surveyor, Municipal Buildings, Glossop. (See our May 25 issue.)

June 21.—N. Scotland H.E. Board. 132 kV double circuit steel tower overhead line (approx. 65 miles route length) between Boat of Garten (Inverness-shire) and Aberdeen. Merz and McLellan, 39 Northumberland Street, Edinburgh 3. Deposit £2 2s. (See our May 11 issue).

June 23.—Belfast T.C. 33 kV oil-immersed reactor of non-ferrous shielded type required in connection with harbour power station extensions. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne 1. Deposit £5 5s. Advertised in this issue.

June 30.—N. Scotland H.E. Board. 32 miles of 33 kV and 58 miles of 11 kV single circuit wood pole overhead lines and 77 miles of low voltage lines between Huntly and Ballater in Aberdeen county. Merz and McLellan, 39 Northumberland Street, Edinburgh 3. Deposit £1 1s. (See our May 25 issue.)

July 17.—Waterford C.C. Electrical services comprising lighting, cooking, laundry, sterilising and associated hospital equipment at Ardkeen Sanatorium. Fourteen major buildings, covering 20 acres.) Engineer, N. Matthews, 104 Grafton St., Dublin. Deposit £15 15s.

July 24.—Bootle. Manufacture and erection of pumping plant in Hapsford Road Pumping Station, including two sets of electrically driven unchokeable pumps, each capable of 1,000 gallons per minute, for Rimrose Brook Joint Sewerage Board. Engineer to the Board, G. M. C. Taylor, Artillery House, Artillery Row, Westminster, S.W.1. Deposit £5.

July 31.—Thame U.D.C. Two electrically driven vertical spindle borehole type pumps with ancillary equipment. Engineers: John Taylor and Sons, Artillery House, Artillery Row, Westminster, S.W.1.

No date stated.—Roxburgh. Electrical lighting installation for Hawick High School kitchen and dining centre. County Architect, County Offices, Newtown St. Boswells.

No date stated.—Durham C.C. Electrical installation at Easington Hostel. County Architect, Court Lane, Durham.

OVERSEAS

Details of items marked • may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.

June 12.—New Zealand. 100 milliameter 5-0-50 MA d.c. flush mounting 2½ in. diameter moving coil centre-zero. Director-General (Stores Division), G.P.O., Wellington, C.1. B.o.T. (Ref. CRE (IB) 53094/50).•

June 16.—Montevideo. Supply of masts for support of o.h. lines of 110 kV. Usinas Electricas of Telefonos del Estado. B.o.T. Ref. CRE (IB) 52276/50).•

June 16.—Wellington. 30,000 lamps, switchboard, B.P.O. No. 2, 24 V. Quotation No. P. and T. 150/3396. Director-General, Stores Division, G.P.O., Wellington, C.1.

June 27.—Wellington. Four 3-phase 50 kV 500 MVA circuit-breakers and accessories for Tauranga substation. Deposit £100; bond £275. Secretary, Tenders Committee, State H.E. Dept., Wellington, New Zealand.

June 29.—Brisbane. Supply, delivery and maintenance of 3·3 kV 6·6 kV and 11 kV paper-insulated lead-covered cables of various types including armoured and submarine. Secretary, City Electric Light Co. Ltd., Boundary St., Brisbane.

June 30.—Melbourne. Four electric motor driven pumping units for Red Cliffs Pumping Station. Chief Mechanical Engineer, 31 Flinders Lane, Melbourne.

July 5.—Brisbane. One gas-cum-oil engine-driven generator for Emerald Shire Council Power House. Specification No. 219. State Electricity Commission, Queensland. B.o.T. (Ref. CRE (IB) 52101/50).•

July 12.—Sydney. 4,000 kW rectifier units and energy dissipating resistor units for 1,500 V railway traction. Chief Electrical Engineer, Railways, 19 York St., Sydney.

July 14.—Manila. One hydraulic turbine and governor; and/or one generator, switchgear and station service equipment, supervisory control equipment, power transformer, substation equipment and line materials, for Talomo River No. 2A Hydro-electric Project. Office of the National Power Corporation, 4th Floor, Natividad Building, Escolta, Manila.

July 19.—Queensland. 6.6 kV, 125 kW alternator complete with automatic voltage regulator for Longreach Shire Council. State Electricity Commission, Queensland. B.o.T. (Ref. CRE (IB) 53102/50).•

Your Queries — Answered

"L.E.C." refrigerators, makers of? T.E.—Longford Eng. Co., Ltd., 8-20 Longford Rd., Bognor Regis. (18167)

"Silobabs" vacuum cleaners, makers of? T.E.—C.C.A. (Vacuum Cleaners) Ltd., 109 South St., Ponders End, Enfield, Middx. (18173)

"Litlux" lighting fittings, makers of? T.E.—Dernier and Hamlyn Ltd., 23 Newman St. W.1. (18177)

"Regal" vacuum cleaners, agents for? T.E.—Thomas A. Rowley Ltd., Toll End Rd., Tipton, Staffs. (18184)

"Apex" ironers, agents for? E.E.—Vactric Ltd., Service Dept., Waterloo Rd., Cricklewood N.W.2. (18204)

"Kleenair" air cleansing unit, makers of? T.E.—Small Power Machine Co. Ltd., 4 Sunleigh Parade, Wembley. (18189)

Floor scrubbers, makers of? E.C.—Morphy-Richards Ltd., St. Mary Cray, Kent; R. G. Dixon Ltd., Capitol Buildings, Empire Way, Wembley; Fraser-Tuson Products Ltd., 102 Croydon Rd., Beckenham; Finnell System Ltd., Tudor Works, Park Royal N.W.10. (18193)

"Dumore Husky" grinder, agents for? N.W.—S. R. Golding and Co. Ltd., Power Rd., London W.4. (18195)

The above are selected from questions we have answered this week. If you have a query, send it to us.

Aug. 3.—Western Australia. Pumps, motors and electrical gear for two pumping stations on the Wellington Dam to Narrogin pipeline. Agent General for Western Australia, Savoy House 115-116 Strand, W.C.2.

Aug. 30. — Queensland. Six water tube boilers, complete with accessories, for Capricornia, Townsville and Wide Bay regional electricity boards. Secretary, State Electricity Commission, Scottish Union House, Eagle Street, Brisbane. B.o.T. (Ref. CRE (IB) 52721/50).*

Aug. 30.—Queensland. Three sets of turbo-alternators for Capricornia, Townsville and Wide Bay regional electricity boards. Secretary, State Electricity Commission, Scottish Union House, Eagle Street, Brisbane. B.o.T. (Ref. CRE (IB) 52721/50).*

Sept. 28.—Buenos Aires. Electromechanical plant for "Colonia Sarmiento" h.e. power station in the military zone, Comodore Rivadavia. Argentine Ministry of Industry and Commerce. Ref. No. 153/50. Direccion de Talleres y Suministros. Calle Lavalle 1556, Buenos Aires.

Sept. 28.—Buenos Aires. Materials for hydro-electrical central station at Colonia Sarmiento, including gratings and sluices in the turbine chambers and accessories; sluices in the union channel for the rapid discharge; back discharge floodgate of the charging chamber; floodgates of the discharge chamber; two turbine and generator groups (3-phase, a.c. 50 c/s, 380 V); transformer station; control panels for the hydro-electric and transformer stations; electrical installation for internal and auxiliary services; spares; crane bridge from hydraulic central; repair shop; assembly; trials; instruction of staff; plans for the foundation for the machines, transformer station and proposed installations, and the building for the hydraulic central. Directorate General of Water and Electrical Power, Buenos Aires. B.o.T. (Ref. CRE (IB) 53997/50).*

No date stated.—San Francisco. One P.A.Y. automatic telephone exchange 15 table telephone instruments, 12 wall mounted telephone instruments for Gal OYA power plant, Ceylon. Morrison-Knudsen Co. Inc., 1 Montgomery Street, San Francisco. B.o.T. (Ref. CRE (IB) 52392/50).*

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	170 0 0	£164 0 0
Delivered in 2nd and 3rd month after order ...	171 10 0	—
Delivered in 4th, 5th and 6th month after order	173 0 0	—
LEAD, good soft pig (foreign)	96 0 0	96 0 0
,, ,, ,, ,, "English" quality	97 10 0	—
Delivered in 2nd and 3rd month after order, plus	1 0 0	—
TIN (99-99.75%) ... ... (Cash)	601½-602	—
,, (3 months)	602½-603	—
ALUMINIUM, commercial purity (del.) ...	112 0 0	—
ZINC	111 10 0	100 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.)	41 10 0	—
Mild Steel Tape (0.04 in.)	26 0 0	—

CONTRACTS PLACED

Air Ministry. Internal electrical wiring and airfield lighting. Edmundsons Electric Co. Ltd.

Cardiff T.C. Goods and passenger lift for Council's Westgate Street headquarters. The Express Lift Co., Ltd. £1,282. (Tenders are to be invited for dismantling present lift.)

L.C.C. Electrical installation at Hurlingham School, S.W.6. H. A. Lamb and Sons, Ltd.

Metropolitan Water Board. Six electrically driven vertical spindle centrifugal pumps for Hammersmith pumping station. W. H. Allen, Sons & Co., Ltd. £17,252.

Newry U.D.C. Main Dublin-Belfast trunk road public lighting scheme. Revo Electric Co. Ltd. Estimated cost £4,093.

Newtownards. Supply and erection of fluorescent lighting units, including 182 Wilton-Sieray 3-80 W lanterns. Siemens Electric Lamps and Supplies Ltd.

Stockport T.C. Supply and erection of 148 pre-cast concrete columns and installation of lighting equipment. Concrete Utilities Ltd. Lanterns and 250 W mercury vapour lighting equipment. G.E.C. Ltd.

TRADE NOTES

Annual Holidays.—The Barton Hill Works, Bristol, of the General Accessories Co., Ltd., will be closed for the annual holiday from July 28 to Aug.8. A skeleton staff will be available to deal with urgent correspondence.

B.E.A.M.A. Contract Price Adjustment Formulae.—For purposes of calculating variations in: (*a*) "Rates of Pay," the rate of pay for adult male labour at May 13, 1950, shall be deemed to be 115/-; (*b*) "Costs of Material," the index figure for intermediate products last published by the Board of Trade on May 13 is 277·9 and is the figure for the month of April, 1950.

Change of Address.—As from June 1, the headquarters of the Department of Scientific and Industrial Research will be at Charles House, 5-11 Regent St., S.W.1. The telephone number remains Whitehall 9788. For the time being the headquarters of the Hydraulics Research Organisation, and the Mechanical Engineering Research Organisation, will remain in Rex House, Regent St., S.W.1, their new phone number being Whitehall 1952.

Change of Name.—To better indicate their scope of activities the name of Machine Tool Electrics Ltd., has been changed to M.T.E. Control Gear Ltd.

S.A. Acquisition.—Scottish Cables, Ltd., state that their offer to acquire the works owned by Rhodesian Cables, Ltd., at Pietermaritzburg, to which we referred on May 4, has been approved by that company's shareholders. A new company, Scottish Cables (South Africa), is to be formed with capital of £800,000.

Zinc Price.—As from May 25, the price of good ordinary brand zinc was increased by £4 to £107 10s. a ton delivered, and to £111 10s. as from May 30

BUSINESS PROSPECTS

HOME

Bolton T.C. Erection of 120 houses at Padbury Way on Top-o'-th'-Brow estate. Housing Director, Town Hall, Bolton.

Chelmsford R.D.C. Erection of 32 dwellings at Writtle. Estate Manager (Room 26), R.D.C. Offices, New London Road, Chelmsford.

Cleethorpes T.C. Erection of 40 houses on Highgate housing site No. 4. A. B. Cooper, Borough Engineer, Council House, Cleethorpes.

Conisborough U.D.C. Erection of houses at Conanby No. 2 site, Old Road. Engineer and Surveyor, 5 High Street, Conisborough.

Crook and Willington U.D.C. Erection of 45 houses at Howden-le-Wear. T. A. Page, Son and Hill, 75 King Street, South Shields.

Croydon T.C. Erection of houses on New Addington estate in three groups of 47, 89 and 104 houses. Borough Engineer, Town Hall, Croydon.

Dagenham T.C. Erection of 54 flats at Whalebone Lane South. Borough Engineer and Surveyor, Civic Centre, Dagenham.

Docking R.D.C. Erection of 12 houses and 6 bungalows. G. E. Gibson, Housing Officer, Council Offices, Docking, King's Lynn.

Doncaster R.D.C. Erection of 22 dwellings at Hatfield Lane, Armthorpe. J. A. Williams, Surveyor, Nether Hall, Doncaster.

Dover T.C. Erection of 24 flats on Stembrook site. Borough Engineer, Brook House, Dover.

Fareham U.D.C. Erection of 92 dwellings on Fareham Park housing site, and seven pairs of semi-detached houses on site near Isolation Hospital. Engineer and Surveyor, Westbury Manor, Fareham.

Great Yarmouth T.C. Construction of industrial premises at Fenner Road. Borough Engineer, Town Hall, Great Yarmouth.

Hastings T.C. Erection of secondary modern school for 360 girls at Red Lake. Borough Engineer and Surveyor, 37 Wellington Square, Hastings.

Hendon T.C. Erection of 42 flats at Bittacy Hill, Mill Hill. A. O. Knight, Town Hall, Hendon, N.4.

Ledbury U.D.C. Provision and erection of 25-ft. concrete standards and 250 W mercury discharge lamps. Contractors to forward names to Engineer and Surveyor, F. J. East, Council Offices, Church Street, Ledbury.

Maidstone. Home Office approved scheme for repairs to electrical system at county fire headquarters. Estimated cost £1,644.

Portsmouth T.C. Erection of 86 houses at Leigh Park and 54 flats at Paulsgrove. City Architect, 1 Western Parade, Portsmouth.

St. Albans R.D.C. Erection of 12 old people's dwellings Offa's Way, Wheathampstead. E. W. Wheeler, Clerk, 43 Upper Lattimore Road, St. Albans.

Sawbridgeworth U.D.C. Erection of five pairs of houses and two pairs of bungalows at Bull Fields estate. Architect: C. E. Culpin, 3 Southampton Place, W.C.1.

Sheffield T.C. Erection of 110 houses on Stradbroke estate. City Architect, Town Hall, Sheffield.

South Cambs R.D.C. Erection of 10 houses. B. G. Craft, Clerk, County Hall, Hobson Street, Cambridge.

South Westmorland R.D.C. Erection of 40 houses. Architects: Middleton and Jones, 1 Queen Street, Lancaster.

Spalding U.D.C. Erection of two blocks of houses on St. Paul's housing estate. Architect and Surveyor: L. S. Gornall, Short Street, Spalding.

Stanley U.D.C. Erection of 42 houses on Coach Road housing site. J. Hustwit, Engineer and Surveyor, Council Offices, Coach Road, Outwood.

Tottenham T.C. Erection of block of 16 four-storey two-bedroom flats at Reynardson's Almshouses site, High Road, N. 17. Borough Engineer, Town Hall, N.13.

Ventnor U.D.C. Erection of 16 houses. Engineer and Surveyor: Geoffrey Poole. Salisbury Gardens, Ventnor, Isle of Wight.

Wandsworth T.C. Erection of an 8-storey and 2 7-story blocks of flats (126 dwellings) in Roupell Park estate, Brixton Hill, S.W.2.

Washington U.D.C. Construction of new council offices at Washington. E. M. Lawson, Barras Buildings, Barras Bridge, Newcastle-on-Tyne.

West Ham T.C. Re-erection of 44 flats on Manor Road site. T. E. North, Borough Architect and Planning Officer, 70 West Ham Lane, E.15.

West Lothian C.C. Various trades for erection of 30 houses at Blackridge, 16 at Ecclesmachan, 24 at Kirkliston, and 32 at Stoneyburn. W. A. Dick Smith, County Buildings, Linlithgow.

Westmeath C.C. Construction of 18 cottages. E. Woulfe, County Secretary, County Buildings, Mullingar.

West Sussex C.C. Recommended to authorise County Architect to obtain estimates for rewiring of electrical installations in House block at Midhurst Grammar School.

Whitby U.D.C. Erection of 30 houses off Stakesby Road. Architects: Peacock and Bewlay, 224 Hagley Road, Edgbaston, Birmingham 16.

Whitley Bay U.D.C. Erection of 36 houses on Foxhunters housing scheme. Engineer and Surveyor, Council Offices, Whitley Bay.

Wigan R.D.C. Erection of 18 houses on Shevington site. Council Surveyor, Bank Chambers, Wallgate, Wigan.

Wilts C.C. Erection of a secondary modern school at Shurnold, Melksham. F. L. Bowden, County Architect, County Hall, Trowbridge, Wilts.

Worsborough U.D.C. Erection of 30 houses on Elm House estate. Architects: Taylor Knight and Co., All Saints Square, College Street, Birmingham.

York T.C. Erection of one block of 30 flats, Navigation Road and block of 10 flats at Byland Avenue. Chas. J. Minter, City Engineer and Architect, Guildhall, York.

OVERSEAS

South Africa. R. T. Urquhart and Co. (Pty.) Ltd., 201-205 New Commercial Exchange, Harrison Street, P.O. Box 584, Johannesburg, is interested in new electrical lines, particularly pertaining to mining.

The Universal Engineering Co., Chateaux Windsor, Churchgate Extension, Bombay, wish to take out an agency for diesel engines for agricultural, electrical and marine use.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Boffin. B676,678. Class 7. Knife cleaning, dishwashing, mincing, cork drawing, cream separators, juice extractors, potato peeling, rinsing machines, etc. Raylor Bros., Ltd., 56 Lord St., Southport.

Blumag. 685,025. Class 7. Magnetic separators. H. S. Greenwood and Sons, Ltd., 47 Princess St., Rochdale.

Lillo-Solet. 687,532. Class 10. Electric sunray lamps. Tellux Ltd., 17-19 Edge St., London, W.8.

Magimix. B686,136. Class 7. Mixing machines. E. J. Bowman (London) Ltd., 58 Paddington St. London W.1.

Design showing a balloon. 680,610. Class 9. Electric cables and thermocouples being temperature testing apparatus. Avica Equipment Ltd. 50 Pall Mall, London S.W.1.

Magic Wand. B682,629. Class 9. Aerials for wireless. H. W. Berwick, Victor Buildings, The Bridge, Walsall.

Matic-maid. 685,025. Class 7. Dish washing machines. H. J. Fink, 46 Bedford Court Mansions, London W.C.1.

Silmag. 685,486. Class 7. Magnetic separators. 685,487. Class 9. Magnets. H. S. Greenwood and Sons, Ltd., 47 Princess St., Rochdale.

Yelsen. 678,881. Class 10. Blankets, pads for personal use, quilts, mattresses, and bandages for therapeutic use, all being electrically heated goods. Modern Electrical Industries (Southern) Ltd., 9 Hatherley Road, Sidcup, Kent.

MEETINGS TO NOTE

FRIDAY, JUNE 2

A.S.E.E. (Liverpool branch).—Electrical quiz team. Liverpool engineering Society, 9 The Temple, 24 Dale Street, Liverpool.—7 p.m.

TUESDAY, JUNE 6

MECHANICAL HANDLING.—Exhibition at Olympia, London (open until June 17).

WEDNESDAY, JUNE 7

I.E.E. (Radio section).—Soiree, Institution, Savoy Place, W.C.2.

FRIDAY, JUNE 16

INSTITUTION OF ELECTRONICS.—Ultrasonics. R. R. Whymark. Royal Society of Arts, John Adam St., Adelphi, W.C.2.—7 p.m.

GAZETTE ANNOUNCEMENTS

VOLUNTARY LIQUIDATION

General Electrical Installations (Wilts) Ltd., electrical contractors, Station Road, Warminster.

Creditors were called together recently when an approximate statement of affairs was submitted which showed liabilities amounting to £3,242 of which £2,442 was due to unsecured creditors and £800 to the Bank. Assets were estimated to produce £924 and after allowing £29 for preferential claims there were net assets of £895, or a deficiency as regarded the creditors of £2,347. Issued capital of the company amounted to £2,000 and, so far as the shareholders were concerned, there was a total deficiency of £4,347.

Since the statement of affairs had been prepared, some of the accounts were paid off some time ago, and in consequence the liabilities would be reduced by approximately £400.

The company was formed on June 1, 1948, for the purpose of taking over an existing partnership business. No accounts had been prepared during the lifetime of the company. Recently judgments had been obtained and in one instance stock had been taken away for auction. In order to avert the sale it had been decided to put the company into voluntary liquidation so that the goods could be recovered for the benefit of the general body of creditors.

A resolution passed confirmed the voluntary liquidation of the company with Mr. L. Prager, of Lovegrove, Prager and Co., 6 Broad Street Place, London E.C., as liquidator, together with a committee of inspection.

BANKRUPTCY

Harold John August Wade and Clara Louise Wade, electrical engineers, carrying on business as "C. and H. Wade and Co.," 40 Dulwich Road, Herne Hill, London S.E.24, and lately at 68 Brixton Water Lane, Brixton, S.W.2.

At the public examination held at the London Bankruptcy Court, Carey Street W.C., on May 23 it was stated that liabilities amounted to £189 against assets of £163.

Donald Rees Williams, electrical contractor, 307 Harrow Road, Paddington, London.

First meeting of creditors was held recently at London Bankruptcy Buildings, Carey Street, W.C., when the Official Receiver reported that the debtor at present serving a term of imprisonment, had filed a statement of affairs which disclosed gross liabilities amounting to £55,628. There were no assets. No resolution was passed, and the estate remained in the hands of the Official Receiver as trustee.

NEW COMPANIES

Extracted from the "Register" issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Central Electrical (Bristol), Ltd., 140c Redland Road, Bristol 6. Electrical engineers, etc. Cap.: £5,000. Dirs.: C. R. Setter and J. B. Setter.

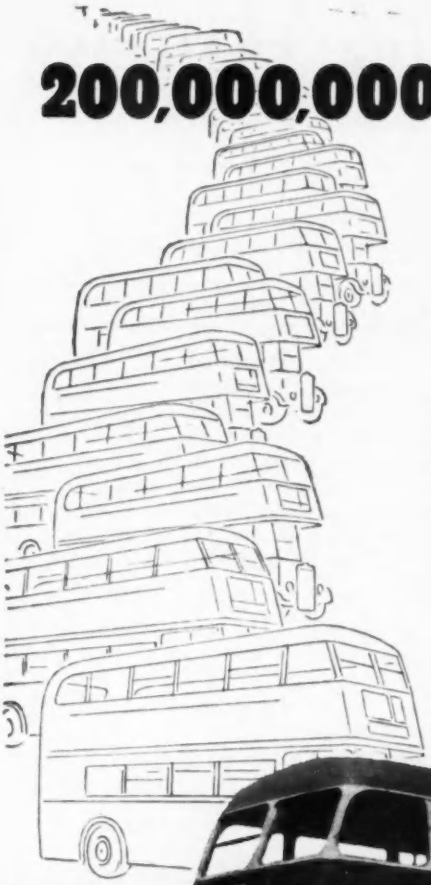
Frank Payne and Sons (Syston), Ltd., Kingsway Chambers, 4 New Walk, Leicester. General, heating, electrical, radio, motor, refrigerating, consulting and constructional engineers, etc. Cap.: £5,000. Dirs.: J. A. Payne and S. H. Payne.

Newlex, Ltd. To carry on business of designers and manufacturers of and dealers in household, domestic and commercial, electrical and gas equipment, etc. Cap.: £1,000. Subs.: H. J. Anderson, 14 Wennington Crescent, Ilford, and J. Y. Watt.

Polytone (Watford) Ltd., Loates Lane, Watford. Designers, manufacturers of and dealers in discharge lighting equipment, neon signs, etc. Cap.: £5,000. Dirs.: G. Freemes, R. Kay, J. Krimholtz and J. MacDonald.

Redgrave Engineering Co., Ltd., Knighton Chambers, Aldwick Rd., Bognor Regis, Sussex. Manufacturers of and dealers in dynamos, motors, armatures, magnetos and generally electrical plant, etc. Cap.: £5,000. Dirs.: R. Redgrave, J. M. Howe, F. G. Stringer.

Thorpe Electric Co., Ltd. Engineers and contractors, etc. Cap.: £3,000. F. J. Candfield, 33 Avenue Rd., W. Ealing, W.13. T. J. Candfield, C. P. Carroll and W. F. Dawes.



200,000,000 passengers per year !

At their Bus Division in Birmingham, the Metropolitan-Cammell Carriage and Wagon Company are using HENLEY CABLES for the fine new fleet of 450 buses now building for the London Transport Executive.

HENLEY CABLES

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.
51-53 HATTON GARDEN, LONDON, E.C.1

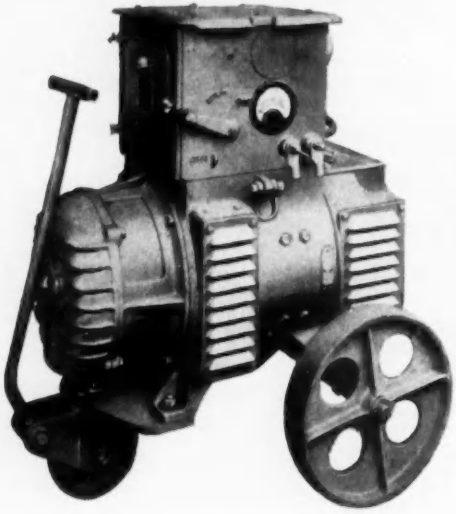
The new fleet will carry approximately 200,000,000 passengers per year.

B.E.P. CONVENTION VISIT STAND No. 7

BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS

Metrovick Welding Equipment

ARC WELDING



Metrovick "Paradyne" Motor Generator Arc Welding Machine, designed for floor mounting or for fitting on truck as shown. Available in two sizes for 300 amps or 400 amps per operator, and for a.c. or d.c. supplies.

also

BUTT WELDERS

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FLASH BUTT WELDERS

SEAM WELDERS

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METROPOLITAN-VICKERS ELECTRICAL CO. LTD.

TRAFFORD PARK, MANCHESTER 17

JIE 905 [

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY AND COUNTY BOROUGH OF BELFAST

Electricity Department

TENDERS are invited for the supply, delivery, and erection at the Harbour Power Station of a 33 kV Oil Immersed Reactor of the non-ferrous shielded type required in connection with the Harbour Power Station extensions.

Form of tender, in quadruplicate, conditions of contract, specification, and drawings may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne 1, on payment of a deposit of five guineas (cheque to be made payable to the Belfast Corporation Electricity Department), which deposit will be refunded provided a bona fide tender be lodged and not withdrawn. Extra copies of the contract documents may be obtained at three guineas per set, which sum will not be returnable.

Each tender, in quadruplicate, in sealed envelope marked "Tender for 33 kV Reactor, Harbour Power Station," and endorsed with the name and address of the firm tendering, must reach the undersigned not later than 4 p.m. on Friday, June 23, 1950.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
May 24, 1950. (F 15

APPOINTMENTS VACANT

SINGAPORE MUNICIPALITY

Electricity Department

CHARGE ENGINEERS, permanent staff, required for shift duties in the Singapore Power Station. Present capacity, 37,000 kWs, with proposed extensions to 87,000 kWs.

Experience of extra h.t. 3-phase generation in a modern high-pressure steam power station is essential. Appointment subject to medical examination.

Basic salary scale, $440-$870 per month. Starting point according to qualifications and experience. Graduated scale of allowances, e.g., present allowances on $500 p.m. basic salary amount to: Expatriation, $110 p.m., plus cost of living, $180 p.m. for single man or $225 p.m. for married man, or $285 p.m. for married man with family. Annual increments $30 per month. Local taxation much lower than England. One Straits dollar equals 2s. 4d. Thus a married man with family on basic salary of $500 would draw equivalent of £1,252 sterling per annum.

Quarters, with heavy furniture provided at 8 per cent. of salary or housing allowance of 12 per cent. in lieu. Initial engagement on three years' agreement; eight months' leave after four years' service. Free medical attention. Passages paid, including family. Compulsory Provident Fund contribution, 7½ per cent. of salary and Municipal Commissioners donate 7½ per cent. for first 10 years, increasing later.

Applications in duplicate, with full personal and technical information and copies of three testimonials, to Messrs. Peirce and Williams (Agents to the Municipal Commissioners), 1 Victoria Street, London S.W.1. (E 642)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

SHIFT CHARGE ENGINEER, Brimsdown "A" Generating Station.

Salary in accordance with the revised N.J.B. Schedule, Grade 7, Class "F" (£625-£643 per annum, plus 5 per cent. London weighting).

Applicants should have served an apprenticeship and obtained an Ordinary National Certificate in Electrical and/or Mechanical Engineering or equivalent and possess experience in the operation of power stations. Experience in the operation of plant at high steam pressure will be an advantage.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, experience, and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than June 9, 1950. Envelopes should be endorsed "Shift Charge Engineer, Brimsdown."

W. N. C. CLINCH,
Controller.

Northmet House, Southgate, N.14. (E 689)

NORTH EASTERN ELECTRICITY BOARD

Tees Sub-Area

APPLICATIONS are invited for the position of ASSISTANT DISTRICT COMMERCIAL OFFICER, Middlesbrough District, with location at Middlesbrough. Salary £550 p.a. (Grade 8, Class "E" of the N.J.B. Schedule).

Applicants should be experienced in the preparation of specifications and estimates in connection with general electrical contracting work, and the control of contracting personnel.

Experience in the development and organisation of electricity supply to all classes of consumers, and graduate membership of the Institution of Electrical Engineers, will be considered an advantage.

Applications, stating age, qualifications, experience and present position, should be submitted to The Manager, Tees Sub-Area, The North Eastern Electricity Board, Central Buildings, Church Street, West Hartlepool, not later than June 10, 1950. (F 11)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the position of INSTRUMENT ENGINEER at Stourport generating station, Class H, Grade 9, commencing salary £609 per annum.

The successful applicant, whose headquarters will be at Stourport "B" power station, will be responsible to the chief testing engineer for the efficient maintenance of all types of instruments associated with the boilers and turbines installed at Stourport "A" and "B" power stations, other than purely electrical instruments used in connection with electrical energy produced or consumed.

Candidates must have had experience in the operation and maintenance of full Bailey automatic boiler control equipment, Multelec superheat controllers, conductivity and CO_2 recorders and radio visor smoke indicators, and should hold the Higher National Certificate in Electrical and Mechanical Engineering or appropriate equivalent qualifications.

Salary and conditions of service will be in accordance with the N.J.B. agreement, and superannuation under terms approved by the British Electricity Authority.

Applications should be made on forms which may be obtained from the Divisional Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, and should be returned not later than June 24, 1950.

F. W. LAWTON,
Divisional Controller.
(F. 30)

MIDLANDS ELECTRICITY BOARD

Wolverhampton and District Sub-Area

APPOINTMENT OF ASSISTANT ENGINEER (WOLVERHAMPTON DISTRICT)

APPLICATIONS are invited for the above position in the Wolverhampton District.

Applicants should have had experience in all branches of distribution work, including operation and maintenance of high- and low-voltage cables, overhead lines, sub-stations, etc. Appropriate technical qualifications will be considered an advantage.

The conditions of service will be in accordance with the National Joint Board Agreement dated February 17, 1950, and the provisional salary, subject to negotiation, will be £607 per annum.

Applications, stating age, present salary, full particulars of qualifications, experience, and present position, should be endorsed "Assistant District Engineer" and forwarded to Mr. F. J. Elliott, Sub-Area Manager, 83 Darlington Street, Wolverhampton, within seven days.

A. STEPHENS,
Secretary.

June 2, 1950. (F 23)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

STATION CHEMIST—ROTHERHAM POWER STATION

APPLICATIONS are invited from suitably qualified chemists for the position of Station Chemist at the Rotherham power station.

Applicants should have had previous experience of power station practice involving the chemical control of feed and boiler waters for boilers operating at 600 p.s.i., fuel sampling, testing and analysis, and lubricating and insulating oil testing. A knowledge of the problems associated with condenser fouling and external boiler deposits would be considered advantageous.

The power station has a capacity of 130 MWs, but extensions now in progress will raise this to 160 MWs.

Conditions of service and salary will be in accordance with Grade 8, Class G, £607 per annum, which should be regarded as provisional and subject to determination by the appropriate organisations.

The appointment will be subject to the provisions of the Authority's superannuation scheme.

Applications should be made on forms obtainable from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within 14 days of the appearance of this advertisement. Envelopes to be endorsed "Station Chemist, Rotherham."

G. A. VOWLES,
Divisional Controller.

(F 20)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointment :—

No. 6 (Hull) Sub-Area

ENGINEERING ASSISTANT (Bridlington District, Driffield). Vacancy No. 31/50.

Applicants should have experience in planning, including surveying and estimating, and construction of mains and substations up to 22 kV with operation of overhead lines up to 66 kV. Preference will be given to candidates possessing the A.M.I.E.E., Grad.I.E.E., or holding exemption qualification.

The successful applicant will be required to undertake standby duty and reside in Driffield.

Salary, N.J.B. Schedule, Class "D," Grade 6, £594-£616 per annum.

Applications, stating the above vacancy number, and giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 6 (Hull) Sub-Area Yorkshire Electricity Board, Ferensway, Hull, within fourteen days of the appearance of this advertisement.

(F 8)

BRITISH ELECTRICITY AUTHORITY

APPLICATIONS are invited for the post of ASSISTANT in the Abstracting and Translation Section of the Central Information Service, which is attached to the Secretary's Department at the London Headquarters.

Candidates should possess some knowledge of engineering or scientific subjects, and have the ability to prepare abstracts of matter appearing in technical publications of interest to the industry. Knowledge of a foreign language, and of subject indexing would be a further qualification.

The salary will be in accordance with experience and qualifications, but will be within Grade 2 of the National Joint Council (Administrative and Clerical) Permanent Salary Agreement, dated March 23, 1950, i.e., £390 by £20 per annum to £450 per annum, plus London allowance of £30.

Letters of application, stating age, and giving details of experience, should be addressed to D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London W.1. The closing date for the receipt of applications is June 8, 1950. Please mark envelopes "AE/69." (F 24)

BOROUGH OF DOUGLAS, ISLE OF MAN

Electricity Undertaking

APPLICATIONS are invited for the following appointments in the Corporation generating station:—

POWER STATION SUPERINTENDENT

Applicants should have a sound technical education and practical experience in the operation and maintenance of a modern steam-generating station. Preference will be given to Corporate Members of the Institution of Mechanical Engineers with experience in the supervision of power station staff. Experience with modern p.f. fired high-pressure boilers is essential.

The salary will be in accordance with Class C, Grade 3 of the Isle of Man Joint Board schedule, at present £710, rising to £724 p.a.

Accommodation can be made available.

SHIFT CHARGE ENGINEER

Applicants should have experience in the operation o a modern steam generating station, and be prepared to undertake maintenance duties. Preference will be given to candidates with experience in modern p.f. fired boilers and possessing technical qualifications up to National Certificate standard.

The salary will be in accordance with Class C, Grade 8 of the Isle of Man Joint Board schedule, at present £494, rising to £514.

The Corporation operates a steam power station of 10 MW capacity. An extension is under construction, consisting of one 5 MW turbo-generator, and two p.f. fired boilers, but the effective capacity of the station would remain at 10 MW.

The appointments will be established posts under the superannuation scheme of the Corporation, and the successful candidate will be required to contribute to the Council's superannuation fund and pass a medical examination.

Particulars of superannuation scheme, income tax and living conditions in the Isle of Man may be obtained upon application to the Town Clerk, Town Hall, Douglas, Isle of Man.

Applications endorsed "Power Station Superintendent" and "Shift Charge Engineer" respectively, giving particulars of age, qualifications, experience and earliest date available, together with three recent testimonials, should be addressed to the Borough Electrical Engineer and Manager, Electricity Offices, Ridgeway Street, Douglas, Isle of Man, not later than June 26, 1950.

PERCY M. SHIMMIN,
Town Clerk.

Town Hall,
Douglas, Isle of Man.
May 24, 1950. (F 16)

SOUTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of DISTRICT COMMERCIAL OFFICER, Torbay District (Headquarters, Torquay) at a commencing salary of £722 p.a. (Class E, Grade 4, N.J.B. Schedule).

The successful applicant will be responsible for the preparation of technical schemes and estimates and participation in negotiations in connection with the supply of electrical energy to industrial premises. His duties will include, inter alia, co-ordination and supervision of work in service centres, installation contracting and all commercial publicity matters.

Candidates should possess extensive knowledge of, and have wide experience on, the engineering and/or commercial side of the industry and be able to promote a progressive development policy. Corporate Membership of the I.E.E. will be an advantage.

Detailed applications, stating age, qualifications, experience, present post and salary to be submitted to District Manager, Torbay District, South Western Electricity Board, Electric House, Union Street, Torquay within 10 days.

E. M. HUGHES,
Assistant Secretary (Establishments).

(F 17)

BRITISH ELECTRICITY AUTHORITY

APPLICATIONS are invited for the appointment of a PRINCIPAL ASSISTANT in the Utilisation Research Section of the Commercial Department at their headquarters in London.

Applicants should be electrical engineers, with a University degree, interested in problems of engineering economics, and practical experience in the electricity supply industry, especially in the design and costing of distribution systems.

The duties would be to assist in investigations in the field of electricity utilisation and supply, with particular reference to the structure of distribution costs and methods of allocating these costs to classes of consumers and types of load.

The appointment, which is superannuable, will be made within Grade 8 of the National Joint Council agreement, i.e. £795-£900 p.a., plus £40 per annum London Weighting.

Letters of application, giving age, qualifications and details of past experience, should be addressed to: D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London W.1. The closing date for the receipt of applications is June 12, 1950.

Please mark envelopes AE/68. (F 4)

KENT COUNTY COUNCIL

APPLICATIONS are invited for the following appointments in the Buildings Department :—

(1) SENIOR ENGINEER ASSISTANT (ELECTRICAL) in A.P.T. Grade VI (£595-£660).

(2) TWO ENGINEERING INSPECTORS in A.P.T. Grade V (£520-£570).

Applicants for (1) must be Corporate Members of the Institute of Electrical Engineers and be capable draughtsmen with good experience in the preparation of schemes, specification and estimates for all classes of electrical installation work. The duties will include the preparation of drawings, inspection of premises and supervision of installations.

Applicants for (2) must have had good practical experience in the design and installation of equipment in one or more of the following:

(a) Electrical installations for buildings.
(b) Low pressure hot water heating and domestic hot and cold water systems.
(c) Steam services associated with heating and cooking installations.

Preference will be given to Members of the Institution of Heating and Ventilating Engineers or the Institution of Electrical Engineers.

The posts are superannuable and the successful candidates will be required to pass a medical examination.

Applications, on forms obtainable from the County Architect, Springfield, Maidstone, must be delivered to him not later than fourteen days after the appearance of this advertisement.

W. L. PLATTS,
Clerk of the County Council.

County Hall, Maidstone.
May 16, 1950. (E 722)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

APPLICATIONS are invited for the appointment of TECHNICAL ENGINEERING ASSISTANTS at Divisional Headquarters at salaries in accordance with Class "AX/CX" of the revised National Joint Board Schedule, Grade 3 (£737-£921 per annum).

Applicants should have had considerable experience in the design and testing of one of the following types of equipment :—

(a) A.C. rotating machinery.
(b) Switchgear (from 33kV upwards).
(c) Transformers with on load tap changing equipment.
(d) Cables (from 33kV upwards).

In addition to their work on equipment on which they have special knowledge, the successful applicants will be expected to take part in the general technical work in the Division.

The appointments are superannuable under the British Electricity Authority and Area Boards' Scheme.

Forms of application may be obtained from the Divisional Secretary at the address below, to whom completed applications should be returned not later than June 12, 1950, in sealed envelopes endorsed " Technical Engineering Assistants."

H. V. PUGH,
Divisional Controller.

Cardiff (Pengam Moors) Airport,
Cardiff.
May 22, 1950. (F 12)

NORTH WESTERN ELECTRICITY BOARD

No. 3 Sub-Area

STATISTICAL ASSISTANT—SUB-AREA CONSUMERS' ENGINEER'S DEPARTMENT

APPLICATIONS are invited for the appointment of Statistical Assistant at No. 3 Sub-Area Headquarters, Oldham. Candidates should have experience in the following:—

1. Collection and collation of information required in connection with standardisation of tariffs.
2. Preparation of estimates of future requirements of domestic, commercial, industrial and agricultural consumers.
3. Tabulation of estimates for energy consumed with respect to street lighting consumption and recording of data required for street lighting.
4. Organising and dealing with such monthly meter readings and other records and statistics as may be required by the Sub-Area Consumers' Engineer.
5. The organisation and supervision of consumers' records under the Kardex system.
6. Organisation of taking of sampling analysis as necessary.

The salary for the post will be in accordance with Grade 4 of the National Joint Council (Administrative and Clerical Grades) for the electricity supply industry salary grades, i.e. £510 by £20 to £570 per annum.

Applications stating age, qualifications, experience, and present post and salary, should be received by E. Binns, Esq., A.M.I.E.E., M.I.Mech.E., Sub-Area Manager, No. 3 Sub-Area, the North Western Electricity Board, Greenhill Offices, Oldham, not later than Wednesday, June 14, 1950. (F 5)

COUNTY COUNCIL OF ESSEX

County Architect's Department

APPLICATIONS are invited for the appointment on the established staff of:—

SENIOR ASSISTANT ELECTRICAL ENGINEER, Grade VI, aptd. Salary will be at a rate of not exceeding £860 a year. Preference will be given to candidates who are Associate Members of the Institution of Electrical Engineers.

ASSISTANT ELECTRICAL ENGINEER, Grade V, aptd. Salary at a rate of not exceeding £570 a year. Preference will be given to candidates holding qualifications leading to membership of the Institution of Electrical Engineers.

Candidates for both appointments should be competent to design and prepare detailed plans, specifications, schedules and estimates of cost for modern electrical engineering plants, including lighting, heating and power installations, generating and distributive services.

In fixing the commencing salary in each case, regard will be had to the experience and qualifications of the successful candidate.

Applications must be made on a form obtainable from the County Architect, Mr. H. Connolly, F.R.I.B.A., at the address stated below (please state post for which form is required), and when completed the form, accompanied by copies of not more than three recent testimonials, should be returned to him not later than June 14, 1950.

Canvassing either directly or indirectly is forbidden.

JOHN E. LIGHTBURN,
Clerk of the County Council.

County Hall,
Chelmsford, Essex.
May 24, 1950. (F 19)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

ASSISTANT SECTION ENGINEER
COVENTRY SECTION OFFICE

APPLICATIONS are invited for the position of Assistant Section Engineer in the Coventry section of the transmission department.

Commencing salary will be within the salary range £516-£647 per annum in Class AX, Grade 6, Schedule C, and thereafter according to divisional classification, at present DX.

Candidates must have had experience in the maintenance and operation of high voltage overhead lines, outdoor transforming and switching stations. Experience of 132 kV equipment would be an advantage.

Corporate or graduate membership of I.E.E. or equivalent qualifications will be required.

The appointment will be subject to the successful applicant entering the British Electricity Authority's superannuation scheme.

Applications should be submitted on the official form of application which may be obtained from the Divisional Establishments Officer, at the undermentioned address, and be returned not later than June 12, 1950.

W. S. BURGE,
Divisional Controller,

British Electricity House,
Barker Gate, Nottingham.
May 24, 1950. (F 18)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for an appointment of GENERAL ENGINEERING ASSISTANT in the Transmission Department at Divisional Headquarters, Woolton, Liverpool.

Candidates should have the Higher National Certificate or similar qualifications and are required to carry out overhead line surveys and to prepare profiles and peg out tower positions. Preference will be given to those with experience and training in civil and structural engineering.

The commencing salary will be within the range of £437-£569 per annum, in accordance with Class AX, Grade 5, of the National Joint Board Agreement.

The appointment will be superannuable under the British Electricity Authority and Area Board's superannuation scheme, and is subject to a medical examination.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Merseyside and North Wales Division, Clarke Gardens, Woolton, Liverpool, and should be returned to him not later than Monday June 12, 1950. (F 25)

AIR MINISTRY have vacancies for DESIGNERS/DRAUGHTSMEN in the Designs Branch of the Works Department for high-class work in the following fields: Mechanical and Electrical Engineering. The work includes design for London Airport. Salaries are on ranges up to £750. Starting pay according to age and qualifications.—Applications, stating age, qualifications, previous appointments and salary required should be sent to Air Ministry, S.2(h), Cornwall House London S.E.1. It is regretted that applications of candidates not called for interview cannot be acknowledged. (F. 21)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the position of DRAUGHTSMAN in the Divisional Transmission Engineer's Department at Divisional Headquarters, Moseley. The salary will provisionally be within the range £430-£570 per annum.

Applicants should have good technical training in mechanical or electrical engineering, and experience in one or more of the following :—

(a) Layout of 132 kV and lower voltage substations.
(b) Electrical diagrams.
(c) Reinforced concrete structure and foundations.
(d) Brick Buildings of the industrial type.

The salary range quoted is to be regarded as provisional until final scales have been negotiated with appropriate organisations, and superannuation will be under terms approved by the British Electricity Authority.

Applications should be made on forms which may be obtained from the Divisional Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, and be returned not later than June 24, 1950. F. W. LAWTON, Divisional Controller. (F 29)

A NUMBER of vacancies will arise this summer for DRAUGHTSMEN at the Bradford works of the English Electric Co. This is due to further expansion, and stable employment under excellent conditions is offered to suitably experienced men. The new drawing office will be concerned with control gear for rolling mills and mining equipment to be manufactured at Bradford. Applications are invited from switchgear and control gear draughtsmen. Electrical and mechanical draughtsmen who have not had previous experience in this field, but who have had sound electrical or mechanical D.O. experience will also be selected. Junior or intermediate grade draughtsmen who wish to gain experience of this interesting electro-mechanical work are also invited to apply. Write, giving full details, quoting Ref. 138 to Central Personnel Services, English Electric Co., Ltd., 24-30 Gillingham Street, London S.W.1. (F 1)

AN interesting opportunity exists for a young and fully qualified ELECTRICAL ENGINEER with knowledge of electronics in connection with servo mechanism development for aircraft. Write to Mr. G. Orloff, Chief Designer, British Messier, Ltd., Cheltenham Road East, Gloucester. (F 3)

APPLICATIONS are invited from young qualified electrical engineers for the position of ASSISTANT ELECTRICAL ENGINEER in a large Chemical Works in the North West. Applicants should be in the age group 25-30 and have knowledge and experience of factory distribution systems at both h.t. and l.t. voltage, installation and maintenance of all types of motors and control gear, lighting requirements and factory wiring systems. Excellent opportunity and experience offered to the right type who wishes to make works engineering his career. Electrical staff at present numbers 60. Staff pension fund in operation. Salary according to age and experience. —State age, education, qualifications and experience in chronological order to: Box No. 1355, Electrical Times.(F 26)

ASSISTANT ENGINEER wanted for wood pole and steel tower contracts in Northern Ireland. Salary according to experience.—Apply: J. L. Eve Construction Co. Ltd., 17 Hill Side, Ridgway, Wimbledon, S.W.19. (E 685)

CONTACT AND SALES REPRESENTATIVE required by James Scott and Co. (Electrical Engineers) Ltd., Glasgow, for South West Scotland. Previous sales experience essential and preference given to one with knowledge of electrical trade. Must be of good education manner and address. Specially good opportunities for young man with energy and sales initiative.—Apply, in confidence, to: A. Stuart Thomson, B.Sc., Auchraw of Mailer, Perth. (E 707)

CONTROL ENGINEERS

CONTROL ENGINEERS for network operation, required by Major Oil Company in Middle East for control centre covering operation of extensive overhead and underground transmission and distribution networks up to 66 kV. Applicants must be experienced in the operation of indoor and outdoor metal-clad switchgear at all voltages, transformers and associated substation equipment. Age not over 35. Attractive salary plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting **Dept. F.116 to Box No. 2584 at 191 Gresham House, E.C.2.** (E 389p)

CONTRACTS MANAGER required by electric cable manufacturers to take full control of installation contracts department. Must have experience in 33 kV cable laying and power station contracts and be capable of organising and controlling entire department, including estimating, technical correspondence, costing, and outside staff.—Apply in writing, stating age, qualification, experience, and salary required, to Box No. 1351, Electrical Times. (F 13)

CROMPTON PARKINSON, LTD., have a vacancy in their Research and Development Department at Chelmsford for an ENGINEER to be engaged in development of switchgear and instrument design. Applicants should be between 25 and 35 years old and possess a good degree or equivalent academic qualification. Experience in laboratory work is essential and a works apprenticeship and later experience of design problems are desirable qualifications. Applications, giving full details of general education, technical education, positions held and salary required, should be addressed in the first place to Ref. JHF/P, Crompton House, Aldwych, W.C.2. (F 2)

DESIGNER/DRAUGHTSMAN required by the manufacturers of "Temco" electrical wiring accessories. Must be familiar with the light electrical apparatus industry. This post carries a good salary and offers scope for advancement for the right man.—Write, giving full details of experience, to Personnel Manager, Telephone Manufacturing Co., Ltd., Martell Road, West Dulwich, S.E.21. (E 521)

DESIGNER DRAUGHTSMAN required for the design and development laboratory of an engineering company of international repute, in London. Applicants must possess Higher National Certificate or equivalent qualifications, and have a practical experience of plastic moulds, small special purpose machinery, press tool work and general machine tool knowledge.—Apply, stating age, qualifications and experience to: Box No. 1357, Electrical Times. (F 27)

ELECTRICAL DRAUGHTSMEN for oil refinery work, experienced in wiring and installation layouts and taking off quantities. Should be capable of laying out small sub-stations and switch-houses. Knowledge of cable layouts and flame-proof conduit work desirable. Five-day week, with paid overtime.—Apply by letter, stating age, experience, salary expected, and when free to commence work, to Chief Draughtsman, The Lummus Co., Ltd., 525 Oxford Street, London W.1. (E 644)

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ELECTRICAL ENGINEERS required for service in Middle East. Applicants should (*a*) possess Ordinary or Higher National Certificate and have had full apprenticeship with heavy electrical equipment manufacturers or with a large colliery or allied fully electrified industry, or (*b*) possess a degree and have had two years' technical apprenticeship with similar firm to above. In each case applicants must have had at least three years subsequent experience on the installation and maintenance of heavy electrical equipment. Maximum age limit 35 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements, pension scheme,—Write, giving personal particulars and details of qualifications and experience, quoting Dept. F.191, to Box No. 2593, at 191 Gresham House, E.C.2. (E 415)

ELECTRICAL ENGINEER, age 23-30, required by consulting engineers for the design of, and preparation of specifications for, the electrical services and equipment for factories, public buildings, hospitals, etc. Applicants should hold degree or equivalent qualifications and have had experience in manufacturer's works. Salary £400 to £600 according to experience.—Write, stating age, qualifications and experience to: R. W. Gregory and Partners, Pilgrim House, Pilgrim Street, Newcastle-on-Tyne 1. (F 10)

ELECTRICAL ENGINEER OR PHYSICIST, with experience of the manufacture of valves or cathode ray tubes, and with Higher National Certificate or equivalent, is required by an X-ray tube production unit for technical control work.—Apply to the Personnel Officer, G.E.C. Research Laboratories, North Wembley, Middx., stating age and record. (E 618)

ENGINEER wanted for sales office of electrical manufacturers near London, to handle quotations and technical correspondence. Experience of motor control gear design essential. Salary £500-£600 per annum.—State age and experience to Box No. 1289, Electrical Times. (E 578)

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Applicants should be thoroughly experienced in the erection and maintenance of the generating plant, substation h.t. and m.t. cables, power, lighting, heating and telephone installations required by such factories.

Applicants should be preferably between 30 and 40 years of age and should have had previous experience in a similar position; they should be corporate members of the Institution of Electrical Engineers or hold qualifications up to A.M.I.E.E. standard.

Superannuation scheme; salary according to age and experience.

All applications (which should contain copies of two or more recent testimonials) would be treated in the strictest confidence and should be addressed to: Lever Brothers and Unilever Ltd., Personnel Division (FMD), Unilever House, Blackfriars, London E.C.4. (F. 31)

JUNIOR DRAUGHTSMAN required. Excellent opportunity of gaining first-class experience in an important branch of the electrical industry. West London area, A.E.S.D. London rate.—Write, full details of experience, to Box No. 1317, Electrical Times. (E 674)

OVERHEAD LINESMAN AND MATES required, Manchester and Northern Ireland.—Apply, J. L. Eve Construction Co., Ltd., 17 Hill Side, Ridgway, Wimbledon, London S.W.19. (E 631)

PRODUCTION control. SENIOR ASSISTANT required, able to control production planning, scheduling, machine shop loading, assembling, and progressing. Experience in light electrical engineering essential, interesting work, with prospects for the right man. Five-day week. Canteen. West London district.—Write, full particulars and salary required, to Box No. 1319, Electrical Times. (E 675)

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SALES ENGINEER required for London area by Accessories Manufacturer on salary and commission basis. Knowledge of electrical installation practice an advantage State experience and basic salary required.—Box No. 1339, Electrical Times. (E 697)

SENIOR ELECTRICAL DRAUGHTSMEN are required by an established British firm with American affiliation. Experience of power distribution and lighting installations as applied to the oil refinery and chemical industry essential. Qualifications to H.N.C. standard. Substantial salaries will be paid to suitable applicants.—Write, stating age, qualifications, and experience, Foster Wheeler, Ltd., 3 Ixworth Place, London S.W.3. (E 676)

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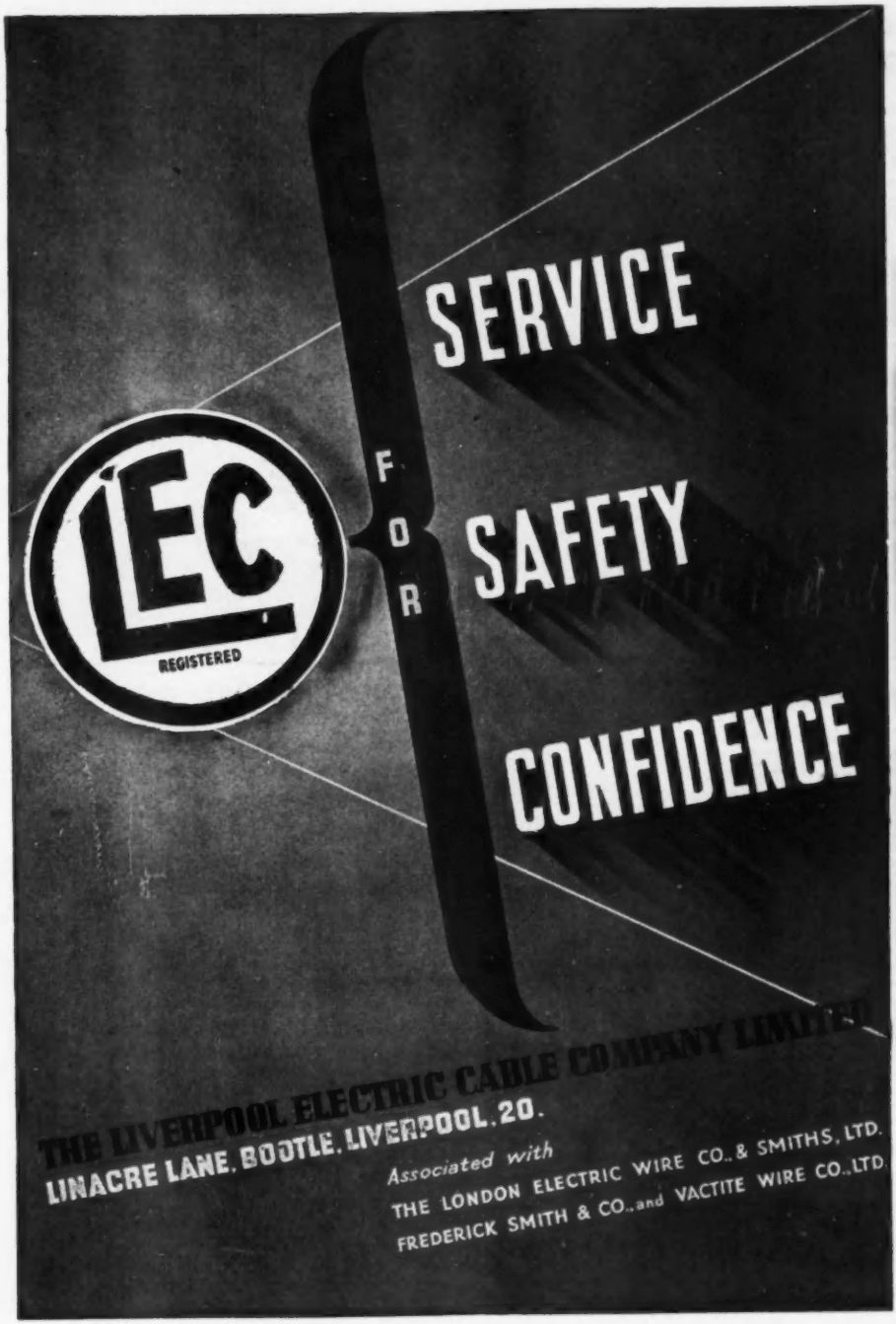
Continued on page 56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Carron Company 24
Carter, B. and F., Co., Ltd. 60
Clyde Blowers, Ltd. 64
Cressall Manufacturing Co., Ltd. 4
Crompton Parkinson, Ltd. 36, 65

Dorman and Smith, Ltd. 76
Drake and Gorham Wholesale, Ltd. 62
Duratube and Wire, Ltd. 19

Electric Construction Co., Ltd. 38
Electropower Gears, Ltd. 56
Engineering and Lighting Equipment Co., Ltd. 25
Elliott Bros. (London), Ltd. 27
Everett Edgecumbe, Ltd. 42
Evershed and Vignoles, Ltd. 8

Ferranti, Ltd. 40
Fluxite, Ltd. 62
Fry's Metal Foundries, Ltd. 44

Geipel, Wm., Ltd. 60
General Cable Manufacturing Co., Ltd. 7
General Electric Co., Ltd. 3, 18, 63
Genristo, Ltd. 60

Hackbridge and Hewittic Electric Co., Ltd. 12
Hague and McKenzie, Ltd. 22
Hardy and Padmore, Ltd. 4
Henley's, W. T. Telegraph Works Co., Ltd. 47
Hoover, Ltd. 46

Jackson Electric Stove Co., Ltd. 14
Johnson and Phillips, Ltd. 13
Jones, Samuel and Co., Ltd. 60

Key Engineering Co., Ltd. 62

Laing, John, and Son, Ltd. 73
Lazarus, Leopold, Ltd. 70
Legg (Industries), Ltd. 10
Lindley Thompson Trans. and Service Co., Ltd. 11
Lipton Products, Ltd. 16
Litholite Insulators and St. Albans Mouldings, Ltd. 72
Liverpool Electric Cable Co., Ltd. 55

Marbourn, Ltd. 66
Measuring Instruments (Pullin), Ltd. 68
Mersey Cable Works, Ltd. 43
Metropolitan-Vickers Electric Co., Ltd. 17, 48
Metway Electrical Industries, Ltd. 68
Midland Electric Manufacturing Co., Ltd. 35
M.K. Electric, Ltd. 61

Nevelin Electric Co., Ltd. 76

Oldfield Engineering Co., Ltd. 64

Pinchin, Johnson and Associates, Ltd. 37
Plasticables, Ltd. 68
Premier Cooler and Engineering Co., Ltd. 4
Premier Electric Heaters, Ltd. 57
Pritchet and Gold and E.P.S. Co., Ltd. 41

Revo Electric Co., Ltd. 20
Reyrolle, A., and Co., Ltd. 32
Rotunda, Ltd. 26
Rowlands Electrical Accessories, Ltd. 71
Runbaken, Ltd. 72

Sanders, Wm., and Co. (Wednesbury), Ltd. 28
Scemco, Ltd. 64
Scholes, George H., and Co., Ltd. 22
Service Electric Co., Ltd. 26
Siemens Electric Lamps and Supplies, Ltd. 67
Simplex Electric Co., Ltd. 31
Simon-Carves, Ltd. 33
S.N. Engineering Co., Ltd. 72
South Wales Switchgear, Ltd. 34
Sperryn and Co. 72
St. Helens Cable and Rubber Co., Ltd. 70
Statter, J. G., and Co., Ltd. 68
Steatite and Porcelain Products, Ltd. 59
Steel Equipment Co., Ltd. 10
Superheater Co., Ltd. 66

Taylor, Tunnicliff and Co., Ltd. 39
Tilling-Stevens, Ltd. 30

U.S. Metallic Packing Co., Ltd. 70

Vacuums, Ltd. 72

Whiteley, B. S. and W., Ltd. 29
Wilkes, John, Sons and Mapplebeck, Ltd. 58
Woden Transformer Co., Ltd. 30

Zenith Electric Co., Ltd. 66

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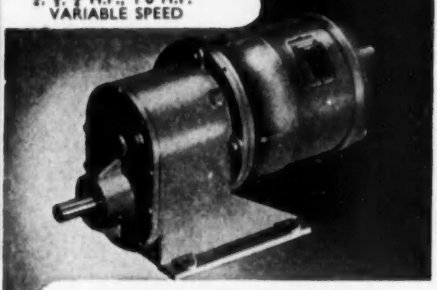

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Continued from page 54

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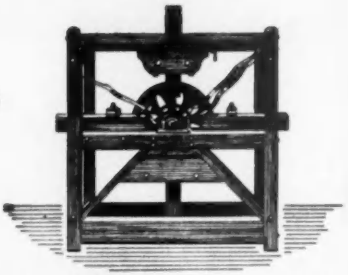

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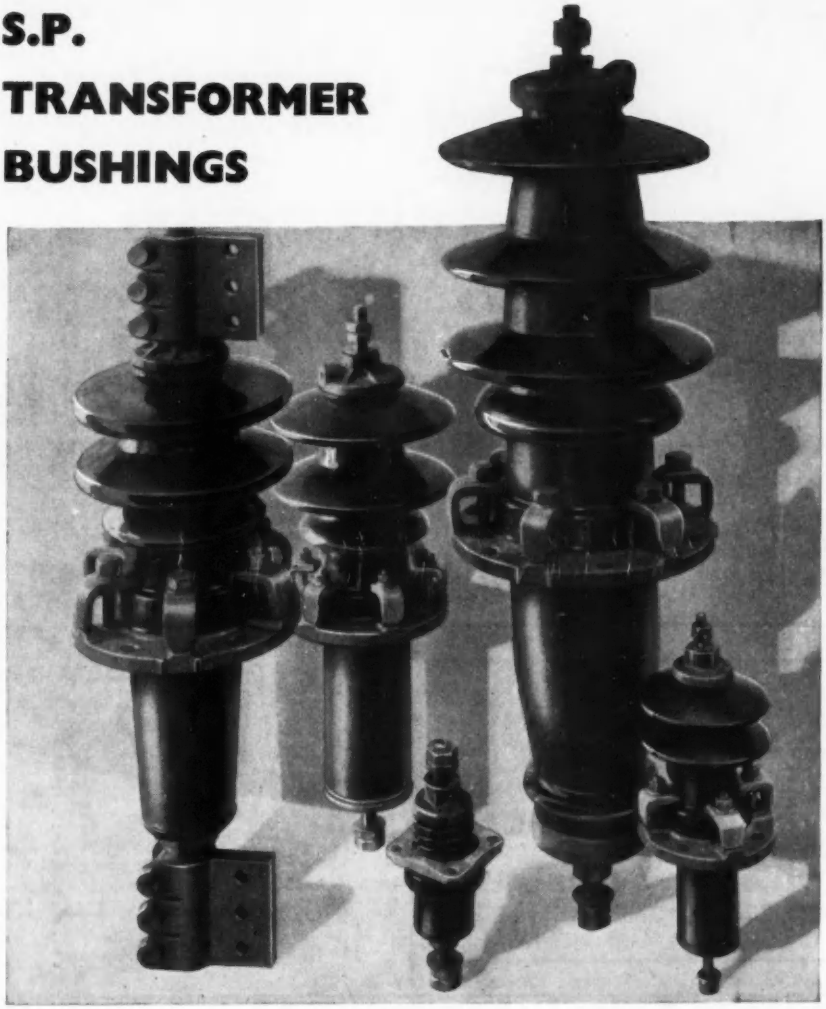

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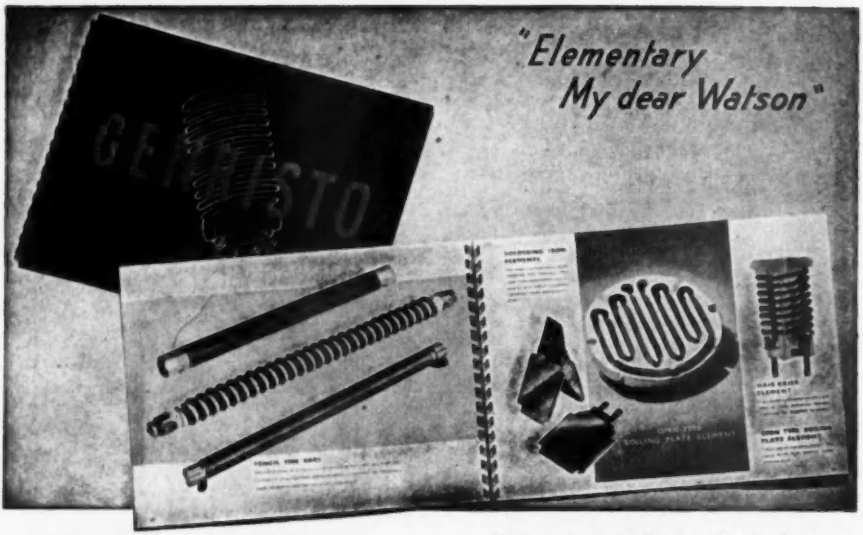

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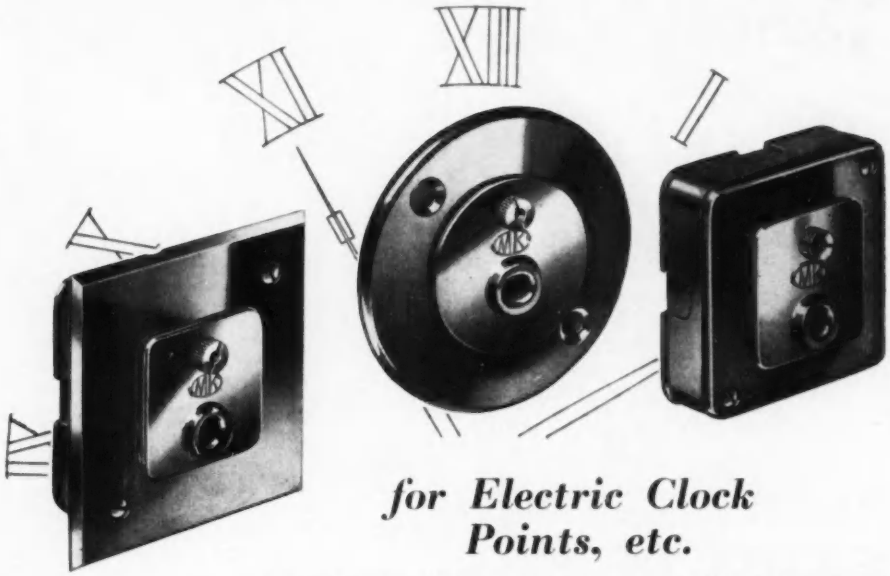

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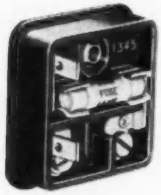

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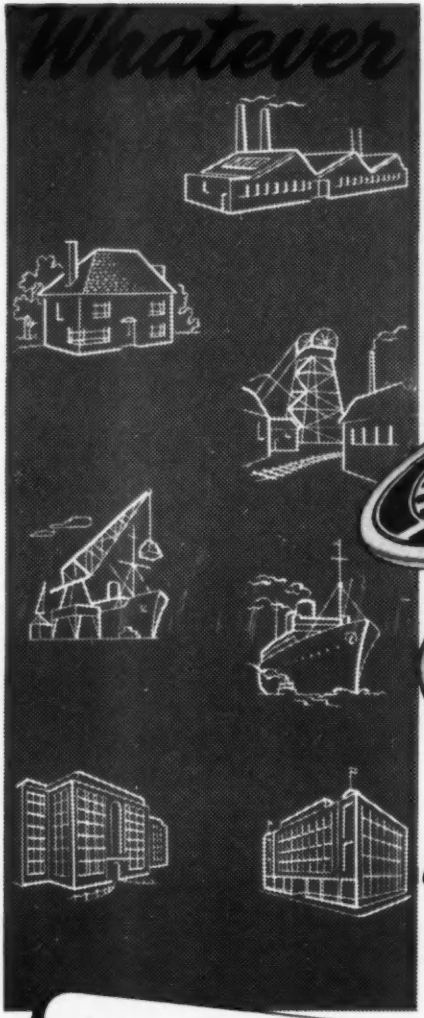

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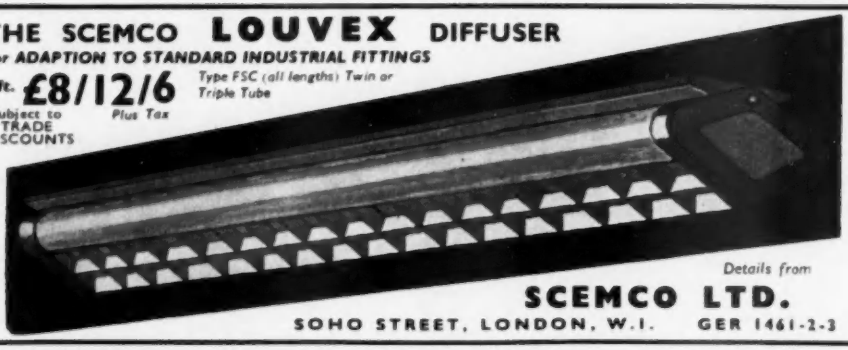

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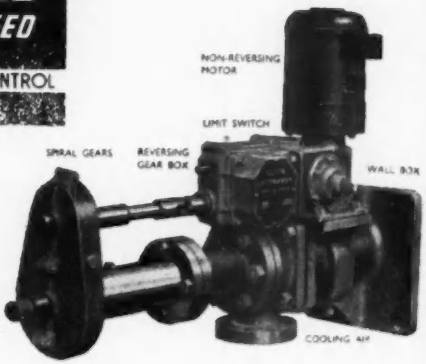

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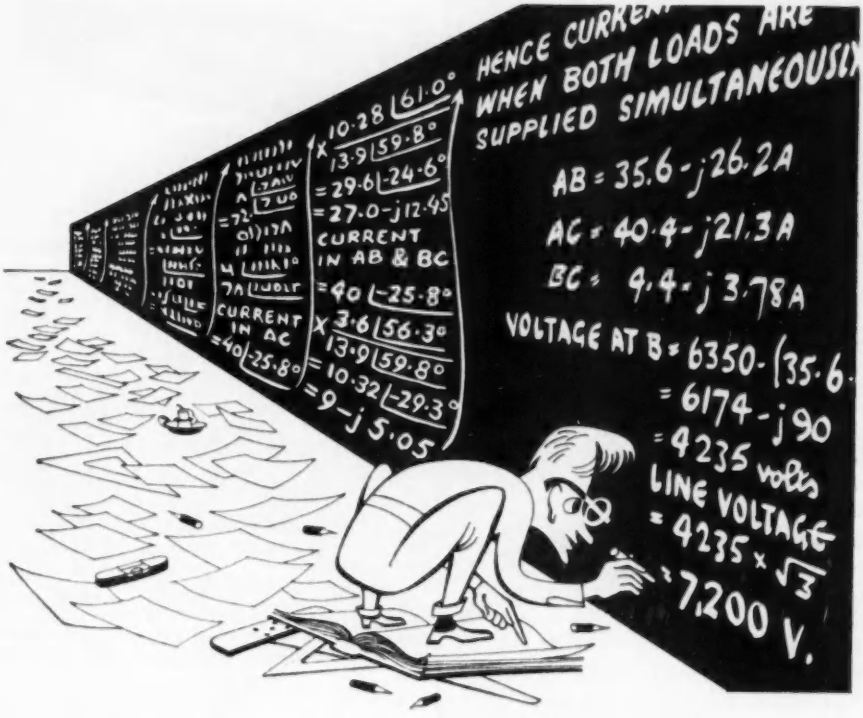

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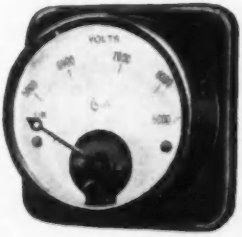

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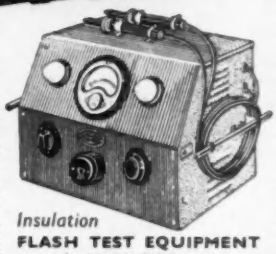

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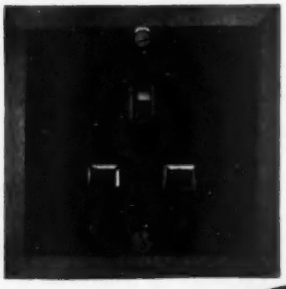

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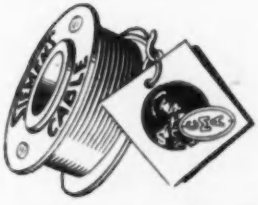

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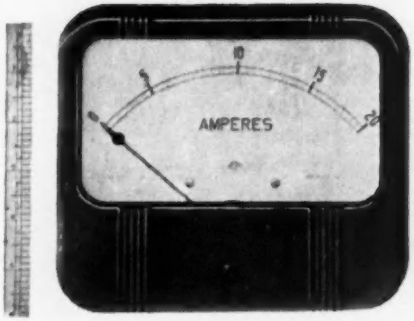

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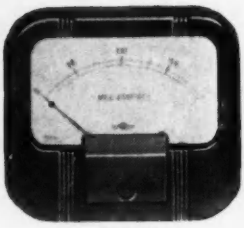

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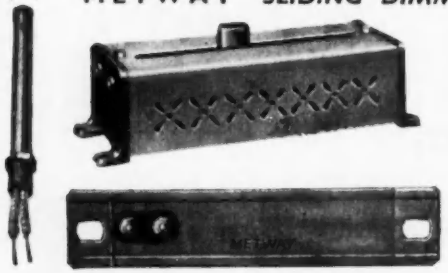

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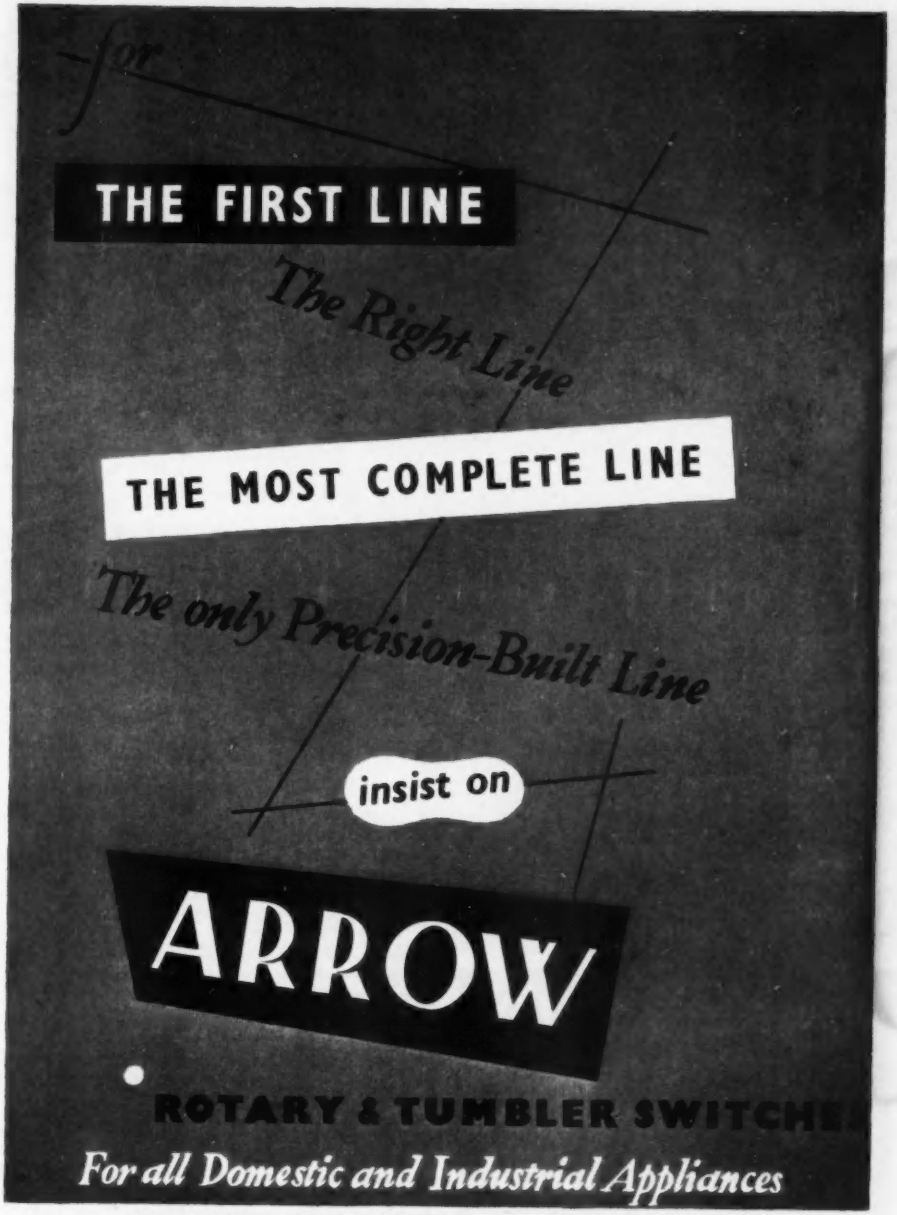
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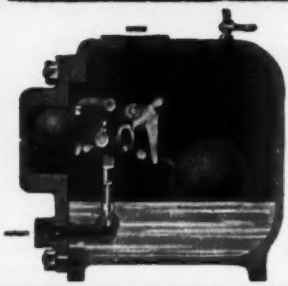

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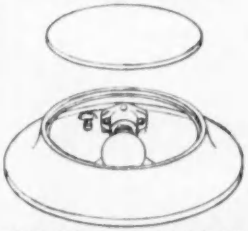

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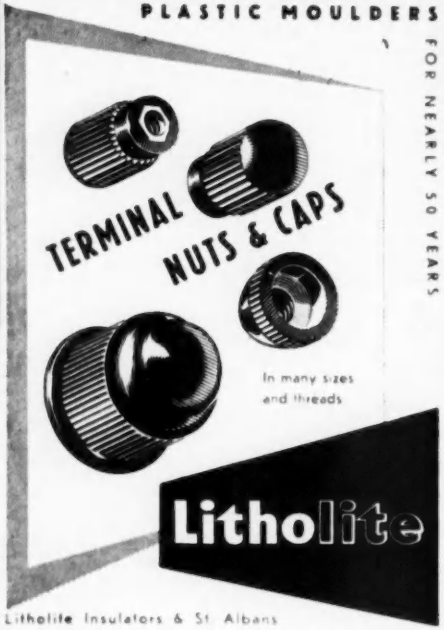

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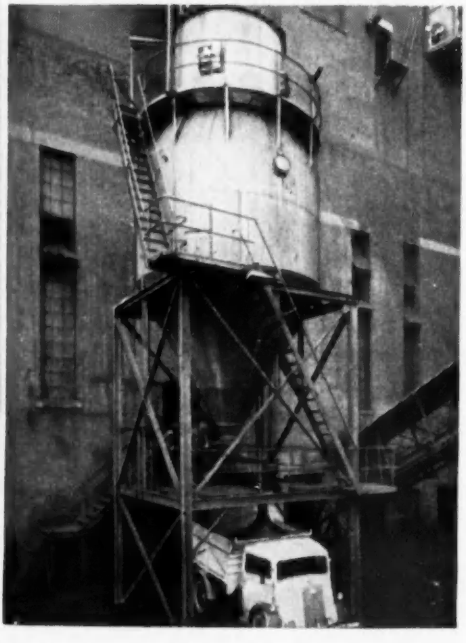

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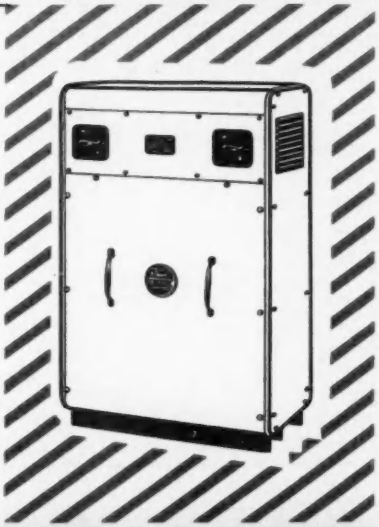

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